THE AMERICAN GAS LIGHT JOURNAL

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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Thirty-fourth Annual Meeting, New England Association of Gas Engineers.

NEW ENGLAND ASSOCIATION OF GAS ENGINEERS,
OFFICE OF SECRETARY,
EAST BOSTON, MASS., Jan. 12, 1904.

The Thirty-fourth annual meeting of the New England Association of Gas Engineers will be held at Youngs' Hotel, Boston, Thursday and Friday, February 18th and 19th, 1904.

There will be a paper on "Inclines," with side topics on other forms of coal gas manufacture. Also papers on "Testing Water Heaters," and "Gas Arc Lamps: Maintenance and Installation."

Several other subjects are being worked up which with the "Question Box" will cause the time of the sessions to be fully occupied.

The attention of members is called to the sending in of forms used by them for the Library.

Detailed information in regard to the meeting will be published later.

N. W. GIFFORD, Secretary.

[OFFICIAL NOTICE.]

Concerning Space at Western Gas Association Exhibit in St. Louis.

WESTERN GAS ASSOCIATION,
OFFICE OF PRESIDENT, PENNSYLVANIA BLDG., PHILA., PA.,
January 4th, 1904.

The applications for space for the exhibiting of gas machinery, models, appliances, etc., on the part of the trade, and a number of gas companies proposing to exhibit, are coming in so steadily that there is no doubt whatever but that all of the available space will be taken at an early date, and that those who may be late in applying will probably be unable to secure desired space. I would herewith state it is necessary that all those who desire to exhibit as above, take the matter up with me by February 1st next, without fail, as after that date no further applications can be considered, and the available space will then be pro rated to the best advantage among those who have applied.

F. H. SHELTON, President.

LIBRARY OF CONGRESS JAN 25 1904 SMITHSONIAN DEPOSIT.

[NOTICE.]

Eleventh Annual Meeting, Michigan Gas Association.

MICHIGAN GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
ANN ARBOR, MICH., Jan. 1, 1904.

The Eleventh Annual Meeting of the Michigan Gas Association will be held in Saginaw, Wednesday and Thursday, the 17th and 18th of February, 1904. The headquarters of the Association will be at the Hotel Vincent. The meeting is to be held in the parlors of the Saginaw Club. The following papers will be read:

"A Few Notes on Ammonia," by Mr. F. E. Sheriff, Battle Creek, Mich.

"The Laying of High and Low Pressure River Gas Lines," by Mr. H. C. Morris, Bay City, Mich.

"The Laying of Mains and Services and Recording of Same," by Mr. John Hellen, Grand Rapids, Mich.

"Care of Benches and Results Therefrom," by Mr. Thos. J. Whalen, Jackson, Mich.

"Advertising: As Advantageous to the Gas Business," by Mr. A. P. Ewing, Detroit, Mich.

"A Report of Progress on the Study of Naphthaline," by Mr. Samuel Ball, University of Michigan, Michigan Gas Association Scholarship.

In addition to these papers, the Question Box will be made the feature of one session. Replies to all questions received are now in preparation.

A beefsteak supper will be served the members at the East Saginaw Club, on the evening of February 17th, by the Saginaw Gas Company.

Rates at the Hotel Vincent have been secured as follows:

Room without bath, for one person.....	$2.50	per day.
" " two persons.....	5.00	"
Room with bath, for one person.....	3.00	"
" " two persons.....	6.00	"

The Bancroft House is an equally good hotel, where similar rates can be obtained. Those desiring good accommodations should write in advance.

This meeting promises to be the best in the history of the Association, and every member is urged to be present. Members of other Associations, and gas fraternity in general, are cordially invited to meet with us.

H. W. DOUGLAS, Secretary.

[NOTICE.]

Third Annual Meeting, Wisconsin Gas Association.

WISCONSIN GAS ASSOCIATION,
OFFICE OF THE PRESIDENT,
RACINE, WIS., Jan. 17, 1904.

To the Members of the Wisconsin Gas Association: The Third Annual Meeting of the Wisconsin Gas Association will be held in Milwaukee, Wednesday and Thursday, Feb. 17th and 18th, with headquarters at the Hotel Pfister.

HENRY H. HYDE, President.

[OFFICIAL NOTICE.]

Premiums Offered, Ohio Gas Light Association.

OHIO GAS LIGHT ASSOCIATION,
OFFICE OF SECRETARY, DELAWARE, O.,
January 4, 1904.

It affords me very great pleasure to announce to the gas fraternity that, in connection with the Twentieth Annual Meeting of the Ohio Gas Light Association, which is to be held in Cleveland, March 16th, 17th and 18th, 1904, Mr. John D. McIlhenny, President of the Association, will offer the following premium for the best paper on "The Best Arrangement for Recovering and Utilizing the Waste Heat from Gas Benches."

Abady's "Gas Analyst's Manual."
Byrne's "Highway Construction."
Carpenter's "Heating and Ventilating of Buildings."
Carhart's "High School Physics."
Crooker's "Electric Lighting," 2 Vols. (1, Station; 2, Distribution).
Crafton, "Handbook of Practical Gasfitting."
Groves and Thorpe's "Gas Lighting."
Hughes and Richard's "Gas Works."
Johnson's "Engineering Contracts and Specifications."
Kent's "Mechanical Engineers' Pocketbook."
Patton's "Treatise on Foundations."
"Self-Instruction in Gas Manufacture."
Wagner's "Chemical Technology."
Newbigging's "Handbook for Gas Engineers."

Competition is open to all. A committee will be appointed and announced later to pass on the contributions and the decision of the committee will be made known at the meeting. Those desiring to enter this competition should have their paper in the hands of the Secretary not later than March 1st, 1904.

T. C. JONES, Secretary.

[OFFICIAL NOTICE.]

Novelty Advertising Department, Ohio Gas Light Association.—No. I.

OHIO GAS LIGHT ASSOCIATION,
OFFICE OF SECRETARY, DELAWARE, O.,
December 12, 1903.

The Editor of the Novelty Advertising Department, Mr. B. W. Perkins, of South Bend, Ind., desires to announce that his department is now open for contributions to be presented at the Twentieth Annual Meeting, which will be held in Cleveland, March 16th, 17th and 18th.

This department is one of the most attractive features of the convention. Its success, however, depends largely upon the active co-operation of the members. It is, therefore, earnestly hoped that the fraternity will not be backward in sending advertising schemes to Mr. Perkins.

T. C. JONES, Secretary.

[OFFICIAL NOTICE.]

Novelty Advertising Department, Ohio Gas Light Association.—No. II.

OFFICE OF THE EDITOR,
SOUTH BEND, IND., December 30, 1903.

The Executive Committee of the Ohio Gas Light Association has added to the Novelty Advertising Department a "New Business Methods Department," which, with the former, will combine any and all methods for furthering the business of gas companies. This will include any scheme or method that has been, or is being, used to further the sales or use of gas, coke, tar, gas fixtures, fittings, ranges, heaters, etc.; in short, all residuals and gas consuming appliances, whether for fuel or lighting purposes.

Contributions are requested from all, whether they are members of the Ohio Gas Light Association or not, as the proceedings are published and the use of any method mentioned is for the use of the fraternity at large. Contributions are requested to be sent as early as possible, as their arrangement and printing require considerable time.

Yours truly, B. W. PERKINS, Editor.

[OFFICIAL NOTICE.]

Wrinkle Department, Ohio Gas Light Association.

OHIO GAS LIGHT ASSOCIATION,
OFFICE OF THE SECRETARY, DELAWARE, O.,
December 28, 1903.

The Editor of the Wrinkle Department, Mr. E. E. Eysenbach, St. Paul Gas Light Company, St. Paul, Minn., earnestly solicits the co-operation of the fraternity for contributions to be presented at the Twentieth Annual Meeting of the Association, which is to be held at the Hollenden Hotel, Cleveland, March 16th, 17th and 18th, 1904.

Editor Eysenbach will be pleased to receive contributions not later than February 15th.

T. C. JONES, Secretary.

BRIEFLY TOLD.

DEATH OF MR. CHARLES L. SCOTT.—With much regret we are obliged to report the death of Mr. Charles L. Scott, Secretary of the Pennsylvania Gas Improvement Company, which sad happening occurred in Philadelphia, the morning of the 14th inst. The funeral services were held at his late residence, 1526 N. 15th street, Philadelphia, the morning of the 18th inst. Mr. Scott was not only Secretary and Treasurer of the Pennsylvania Gas Improvement Company, but was also Secretary of the North Penn Gas Company, of Pennsylvania, Secretary of the Hollidaysburg (Pa.) Gas Lighting Company, and Secretary of the Winston-Salem (N. C.) Gas and Lighting Company. He was a member of the American Gas Light Associoation, his membership therein dating from the last meeting; Detroit, Mich., October, 1903.

NOTES—

MR. M. J. M'GEE, who for the past 25 years has been connected with the Carondelet Gas Light Company, of St. Louis, Mo., and who since 1890 served it as superintendent of its street department, has been transferred to a corresponding position with the Laclede Gas Company, of St. Louis, with headquarters at Station A. An incident connected with the transfer was the unexpected appearance one evening at his home of the employees of the Carondelet Company. They brought with them a handsome combination bookcase and desk and a Morris chair. An up-to-date mantel clock also formed part of the presentation set. Colonel Taylor Stitt made the giving away speech; and, well, the recipient responded in a heartfelt if not Baconian manner. The pleasant proceedings were brought to a happy termination by a well arranged and well served supper. Good luck to "Mr. Mc."

WRITE to the Jeffrey Mfg. Co., Columbus, O., for a copy of "Circular No. 77."

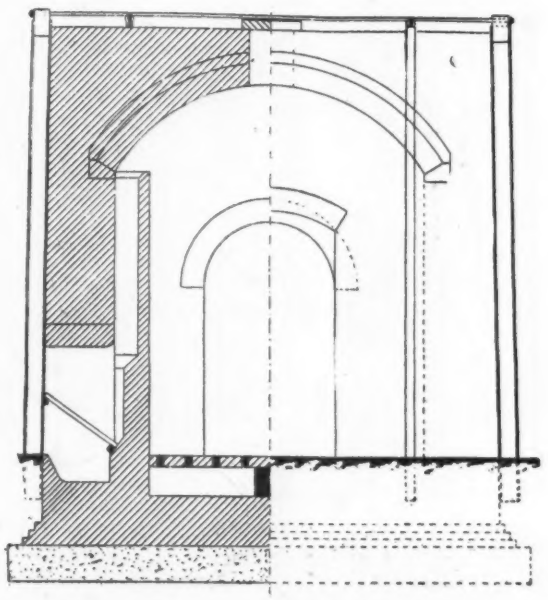
THE manufacture of gas from crude oil is growing in favor in California, particularly in the smaller plants. Many of the larger plants, of course, are making carburetted water gas, and in one or two instances coal gas is made—notably in Vallejo and San Diego.

A New Source of Economy for Gas Works: Firebrick Making at the Crystal Palace District Gas Company's Works.[1]

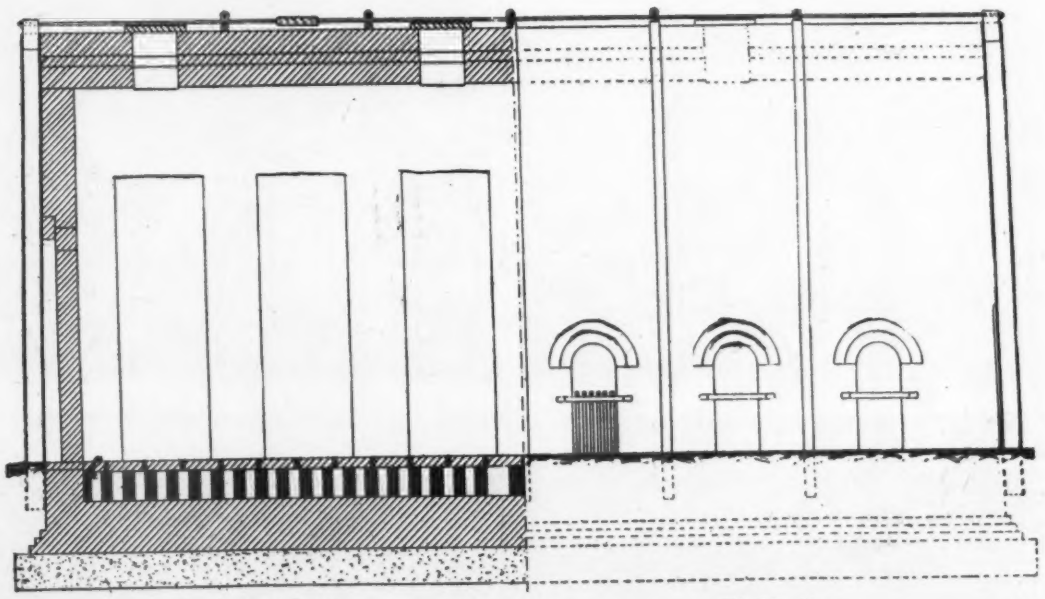
In the search for new veins of economy in gas works which it would pay to open up, there is one which in this country has, we believe, been passed over, except in a single instance, until just recently. And it was on a visit a short time since to the Crystal Palace District Gas Company's works that the exception was found; and the consent of Mr. S. Y. Shoubridge was there and then obtained to the publishing of a short illustrated account of what he has done, and is doing, in the working of this particular new vein.

Let us pause for a moment to indicate it. In all gas works, there is a constant deterioration of the retort settings going on; and the time inevitably comes when parts of the settings have to be renewed, and, ultimately, when they have to be completely replaced. What becomes of all the old retorts, bricks, blocks, and tiles? Their output in prosperous works is a constantly increasing quantity; but their release from service is in most cases regarded as the end of their valuable career—with the result that, when the heap accumulates, no better future is found for the material than its utilization for road making or its burial in the foundations of new buildings. That, says Mr. Shoubridge, is a ruthless waste of valuable fire resisting material; and how he has effected an economy for the Crystal Palace Gas Company by its profitable utilization is what was seen lately at Sydenham, and what is to be here described.

How at Sydenham this hitherto wasted material is made to serve a higher useful purpose than hitherto is suggested by the subtitle of this article. It is now quite 5 years since the Crystal Palace Gas Company first made, by their own men on the works, all the ordinary bricks required for repairs and extensions of buildings; and in this way they have worked a fourfold good. In the first place, they have been able to utilize a considerable quantity of surplus clay that there is on the works; secondly, they have made room in this way for future extensions of the plant; thirdly, they have provided summer employment for some of their stokers who would otherwise have been discharged; and, fourthly, they have secured the bricks they require at a far cheaper rate than they would have had to pay for them outside with delivery on to the works. It will be of interest perhaps to give a few lines of description concerning the ordinary brick making plant, as it was really this which led up to the development now specially under notice. The plant occupies a considerable space in the works, and consists of a wash mill, a set of 3-throw slurry pumps and 2 pug mills, driven by a 6-horse power Crossley engine. In addition, there are four "backs," measuring 86 feet by 48 feet by 6 feet 6 inches each, in which the clay is stored and prepared in winter ready for the brick making season, which commences as soon as the frost is over in the spring. Then there is the "hack" or drying ground, of an area of 200 feet by 250 feet, where the bricks are stacked under covers to dry as soon as made, and where they remain until they are hard enough to go into the "clamps" or kilns, which are built on a strip of ground at the end of the hack ground. This plant is capable of making no less than 2 million bricks a year.



Cross Section. End Elevation.



Longitudinal Section. Side Elevation.

The New Firebrick Kiln at the Crystal Palace District Gas Company's Works.—See Photo. No. 5.

It is not an unnatural result of the success of this manufacture of

Fig. 1.—View of the Old Retort Bench, Showing two Arches Converted into Kilns; also a Portion of the Drying Floor.

1. *Journal of Gas Lighting.*

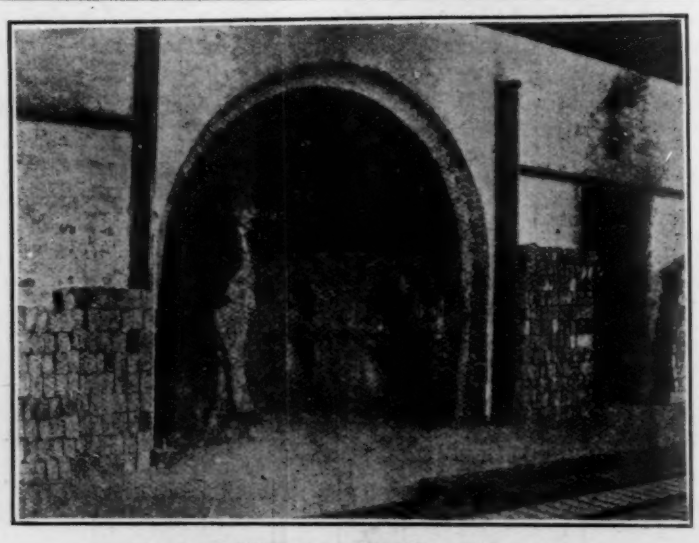


Fig. 2.—End View of one of the Kilns and Furnaces.

ordinary bricks that the Company should be induced to consider the possibility of making as well firebricks, blocks, and tiles. The step from the one to the other is not great. It therefore came about that, something like 18 months ago, a portion of the oldest retort house, which had not been in use for some years, was utilized for the purpose. The retorts were taken out of the settings, the hydraulic mains and other ironwork were removed, and two of the retort arches were converted into kilns by making a number of openings through the division walls to serve as furnaces, and by making new floors having openings communicating with the flues beneath, through which the spent heat was conveyed to the chimney. An idea of the work done to the arches will be gained by an examination of the photographs—Figs. 1 and 2. The floor of the retort house on either side of the bench was excavated to a depth of about 2 feet, and a series of flues, connected with breeze furnaces at one end and with the chimney at the other, were built. The flues were covered with tiles, and made excellent floors (Fig. 3) for drying the newly made bricks upon before they were put into the kilns. The only other things needed were a powerful grinding mill (Fig. 4), in which the old firebrick rubbish from dismantled retort settings is ground up before being incorporated with the new fire clay, an engine to drive it, and the necessary moulds and moulding benches. The engine, which is of 30-horse power, was supplied by Messrs. William

Fig. 3.—View of a Portion of the Drying Floor.

Fig. 4.—View of the Mill Used for Crushing Old Firebrick Material and Grinding Fireclay

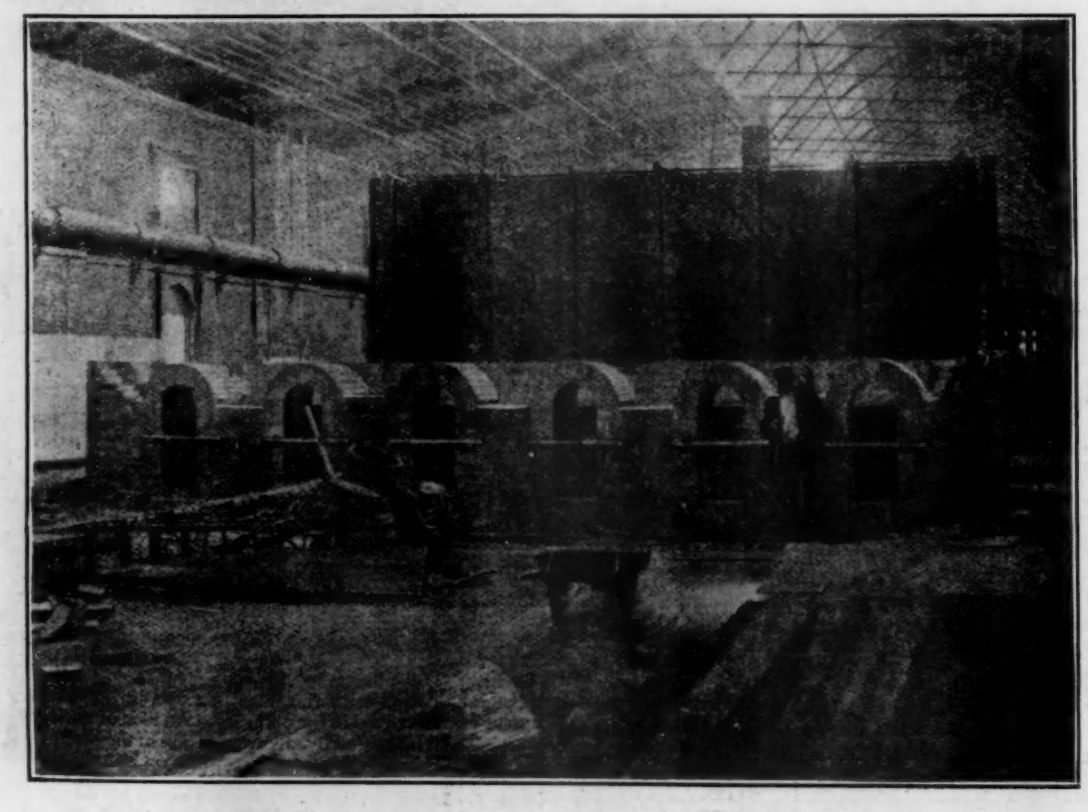


Fig. 5.—Kiln in Course of Construction in Foreground: Completed New Kiln in Rear.

Grice & Sons, of Birmingham; and the grinding mill, which is of the top driven type, was made by Messrs. Scholefield, of Leeds.

The old kilns were each capable of containing 12,000 nine inches by 4½ inches by 3-inch bricks, or their equivalent in tiles or blocks, and took 9 days in working off—viz., 3 days drying, 3 days hard firing, and 3 days cooling. These kilns, however, were too small for economical working; the fuel used being sufficient to burn a much larger number of bricks. Therefore, after 12 months' running of the old kilns, a new and improved one to hold 36,000 bricks, was specially built; and this is large enough to permit of—mark this!—retorts, as well as bricks, being burnt in it. This extensive kiln is shown in the rear of the photograph Fig. 5; and an interior view of an adjoining partly constructed kiln of equal dimensions is also given (Fig. 6). The old kilns and retort bench, which, though they did excellent trial service, were of a somewhat makeshift character, have been pulled down, ground up, and converted into new bricks; and the space occupied is now being turned into a large drying floor. It is seen from this that nothing in the way of old firebrick is wasted.

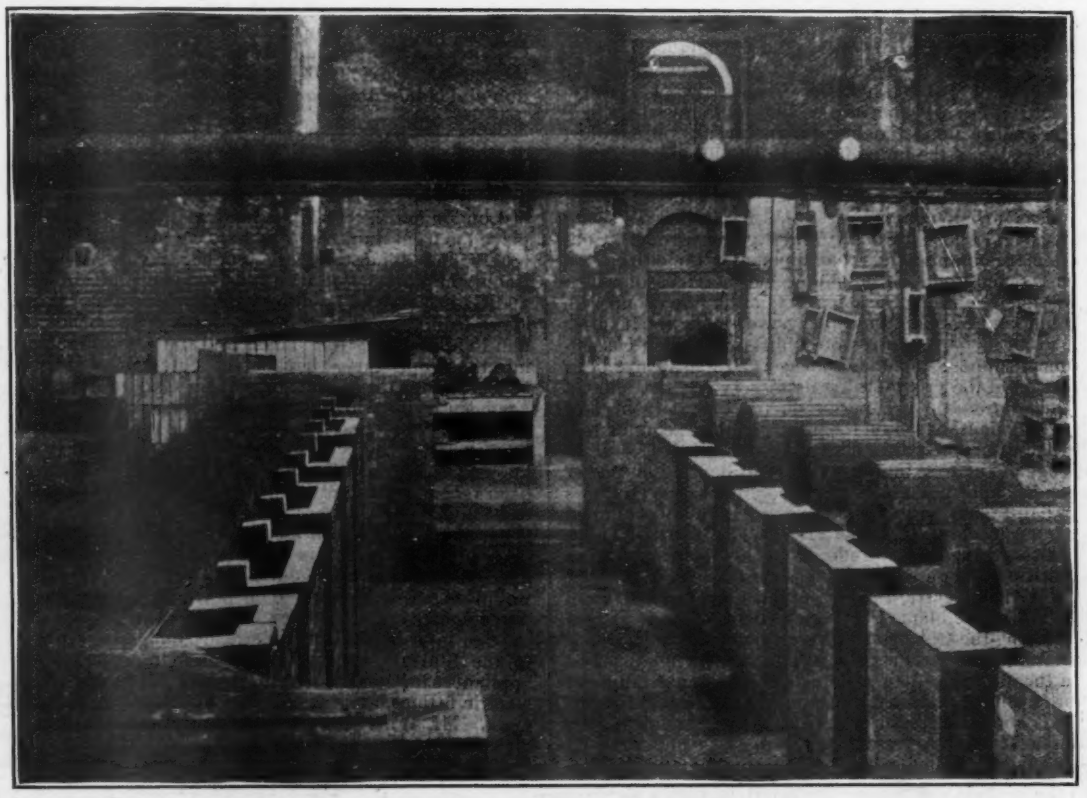


Fig. 6.—Interior of the Kiln in Course of Construction.

It was not within us to try to draw Mr. Shoubridge on the score of costs in connection with such work as this. But the improvement and enlargement of the plant tells its own tale of success from the financial standpoint, and, if further evidence were wanted, it would be found in the statement that probably next season the bricks which have hitherto been made by hand will be produced by machinery driven from the present engine. This will considerably reduce the cost of making; and the plant will then be a very complete one.

As to the preparation of the material for the making of the firebrick goods. New fireclay is obtained in the rough state from collieries in the Midlands, and, after being ground, is mixed with the old fireclay material previously ground up, in the proportions of 30 per cent. of new clay to 70 per cent. of old material. The mixture is found to make excellent bricks, capable of standing great heat, and Mr. Shoubridge informs us, equal in every way to those formerly purchased from Stourbridge. The Company has tried its hand at making retorts, and has produced a few lengths very successfully. It has, however, confined itself principally to making the bricks, blocks and tiles (Fig. 7), of which it uses large numbers every year. It is found that a considerable saving is effected in this way, and it is obvious that it must be so, when it is remembered that 70 per cent. of the new brick material is composed of the old retorts and bricks that formerly were used for road making, and sometimes even cost money to dispose of. The waste of all this valuable fire-resisting material is now stopped—at Sydenham; and the monetary advantages realized by the Company include the saving of the cost of carriage and makers' profits on 70 per cent. of the firebrick material used, excepting the retorts, and, moreover, the wages of firebrick making goes to the Company's own men. That is an especial point of gratification to the engineer.

The Crystal Palace District Gas Company are, we believe, the first gas company in this country to make their own firebrick goods; but it is understood that other companies are now profiting by their example, and will soon have firebrick plants in operation. As will have been gathered from the description, the plant required is of an ordinary character; and in its operation and attendance it does not require any exceptional ability. It was of interest to learn with what ease the men had turned to the work, and to see with what skill they are now per-

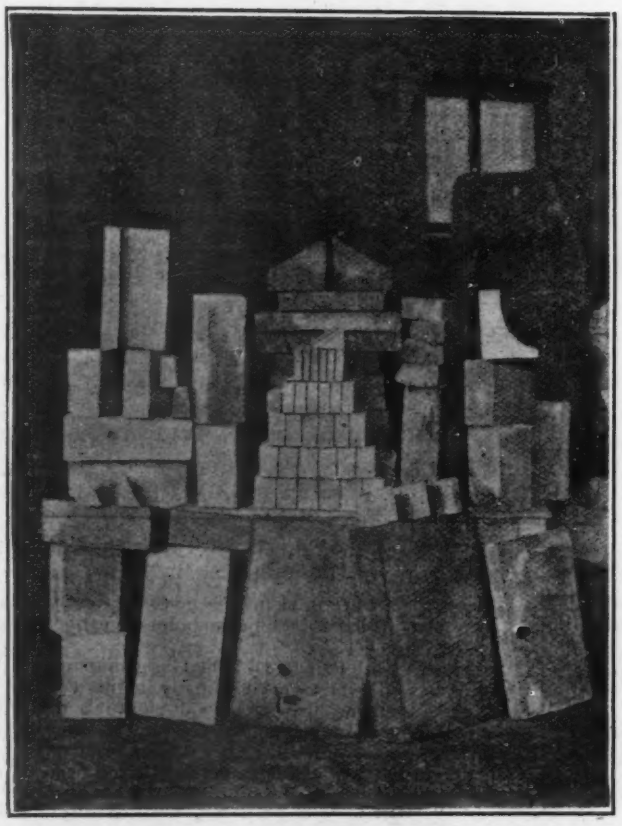


Fig. 7.—Specimens of the Firebricks and Blocks Made by the Crystal Palace Gas Company's Plant.

forming it. The quality and general finish of the firebricks and the numerous forms of blocks which they produce are, judging from the samples seen, of the highest, and that good character, we are told, is fully upheld in the use of the goods.

When the enormous bulk of firebrick material that is discarded in large and medium-sized gas works in the course of the year is remembered, it is surprising that it has not been before this turned to profitable account in the manner sketched here. In that bulk of material is a source of economy which, added to the other considerations advanced in this article, as drawn from the experience at Sydenham, merits the attention of gas engineers and managers generally.

The Economic Admission of Steam to Water Gas Producers of the Lowe Type.

[A paper read by MR. G. W. M'KEE, before the Canadian Section of the Society of Chemical Industry.]

It is the general practice of water gas operators to vary the quantity of steam admitted according to the conditions of the producer, these conditions being: (1) Temperature in the generator judged by the length of the preceding "blow." (2) Depth of the fuel bed. (3) The question as to whether an up or down run is being made. (4) The length of time that has expired since clinkering. The amount of steam admitted is judged by the number of turns given to the valve, sometimes checking the working of the steam line by an observation of the nozzle pressure, taken from a Bourdon's gauge placed on the wall. The important point to which it is desired to call attention is that in every case the steam valve is left open the same amount during the whole run.

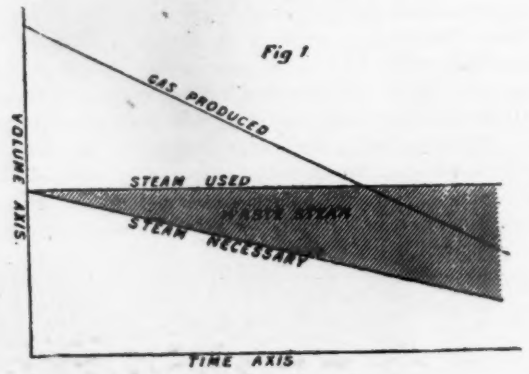
If we consider the reaction for the formation of water gas, viz.:

$$\underset{\text{1 vol.}}{C} + \underset{\text{1 vol.}}{H_2O} = \underset{\text{1 vol.}}{CO} + \underset{\text{1 vol.}}{H_2}$$

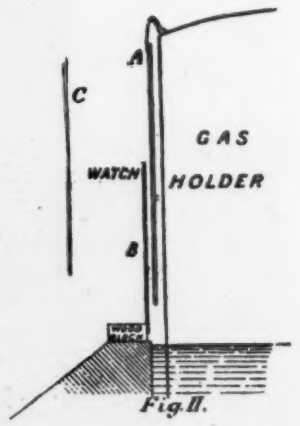
we have 1 volume of steam yielding 2 volumes of gas. Of course, above 1,200° C. the reaction is complicated by the fact that hydrogen acts directly on carbon, forming CH_4, C_2H_2, C_2H_4, etc.; but since the percentages of these gases in water gas are small, we may, for the purposes of the following argument, leave them out of consideration. Of two things we are sure, viz.: (1) The volume of steam used should, at corrected temperature and pressure, be approximately one-half that of the gas produced; (2) if any undecomposed steam gets through the machine we are not running up to the highest efficiency; for (a) it is costly to produce the steam in the boiler room; (b) the surplus steam passing through the generator has to be raised to the heat of the coke, and this heat is abstracted from the machine; (c) this steam must again be condensed in the condensers, thus necessitating the pumping of extra condenser water; (d) furthermore, the following reaction, $H_2O + CO = CO_2 + H_2$, is liable to be set up in the space above the coke, and in the carburetter and superheater settings. This reaction begins at 625° C., and comes to an equilibrium which is in accordance with the temperature prevailing in the machine.

The experiments which follow were conducted in three water gas machines, two of them being those of the United Gas Improvement Company and the third of the Western Gas Construction Company, of Indiana. The length of blow was 6 minutes, and the length of run 8 minutes. In the first place it was observed from the scale board in the operating room that by far the greater portion of the gas made during the run was obtained in the first 3 or 4 minutes. A ¼-inch petcock was then attached to the superheater of one of the machines, and a "dry" run was made. A thin-walled glass Leibig condenser was attached to the petcock, and it was found possible to condense water out of the gas at the latter part of the 8-minute period. Comparing, then, the gas produced and the quantity of steam employed, Fig. 1 may be expected to represent the condition of affairs.

In order to accurately determine the amount of gas produced at short intervals, and to establish a curve on the lines indicated above, various devices were tried, including Pictet's meter, but the best results were obtained by a direct measurement of the rate from the relief holder. A long rod *A* (Fig. 1), was suspended from the railing that went up and down with the relief holder by means of a strap iron hook. At intervals of about 30 cm., gimlet holes were made in this rod. A second rod *B*, of the same dimensions as the above, was made, and pointed at one end. The other end was secured to a heavy wooden block placed on the same coping of the gasometer, and held in place by weights. A third strip *C* was prepared, with a thumb screw in one end, and strips of heavy paper secured to it by means of tacks. In this way the rod *C*, could be quickly fastened to *A* in such a way that the upper part of the strip of paper on *C* would be level with the



bevelled point of *B*. A small hook was screwed in *B* at the point indicated, and a watch hung on it. All the water gas machines except one were stopped, and the exhauster pumping from the holder was also stopped. When the machine began the run the holder would begin to rise, and, every 15 seconds marks were made on the strip of paper opposite the point of *B*. The strips of wood were sufficiently thin to permit of them all being grasped in the left hand at once, and so the above markings could be quickly and accurately made. These measurements were continued over several days with both "dry" and "wet" runs. The best curves



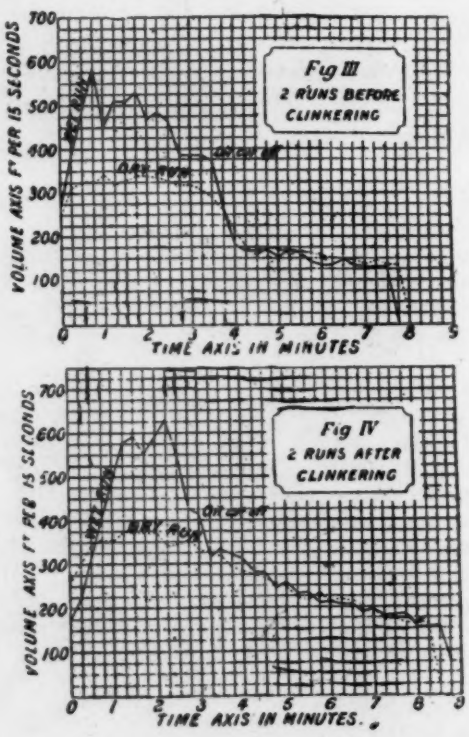


Fig III
2 RUNS BEFORE CLINKERING
VOLUME AXIS FT PER 15 SECONDS
TIME AXIS IN MINUTES
Fig IV
2 RUNS AFTER CLINKERING
VOLUME AXIS FT PER 15 SECONDS
TIME AXIS IN MINUTES.

were obtained on calm days, as the slight movements of the holder caused by wind showed in the curves which were subsequently plotted.

It was also found possible to obtain fairly good curves, with the exhauster running, by having the engineer maintain it at a constant rate, and by noting the rate from a slip of paper both before and after the run.

Very accurate measurements were taken of the capacity of the holders, and a table prepared for convenience in calculation. The distances between the marks on the strip of paper were transferred to a finely divided rule with dividers, thus giving the number of inches between

the markings, and by consulting the table this was readily transferred to cubic feet of gas produced per 15 seconds. In the curves produced we have nearly 1 minute consumed in reaching the maximum rate of output. This is accounted for by the following facts:

(1) The initial fraction is cooled below its average temperature on entering the condenser.

(2) In the case of a "wet" run a certain amount of time is used up in admitting the oil, the inflow of which gradually rises to a maximum.

(3) The mains and the gas already in the holder are further removed from the temperature of the first fraction of the gas than from that formed in the succeeding part of the run. For these reasons the true curve of make conditioned by the internal state of the generator should, without doubt, be parallel to the time axis. This fact would tend to increase the output of the first 3 minutes above that shown in the curves actually obtained, and *ipsa causa*, decrease the output of the latter part of the run. This would be an added argument for the method of operating proposed later on.

From the curves shown it is apparent that the curve falls off enormously between the third and fifth minute in every case, which is about the time that the oil is cut off in the production of a gas of from 18 to 25-candle power. It would seem to be well, then, to cut the steam supply down to one-half directly after cutting off the oil supply. This would be in accord with the convenience of the men in operating the machines. Furthermore, it would be approximately correct, and would allow the machine to have its full capacity during the beginning of the run, thus securing the maximum daily output. This being settled upon, it becomes of importance to know just how much steam passes the inlet valve, and how much it is necessary to close the valve to cut that suppy down to one-half. A series of experiments were done on globe valves to determine the above, and it was established beyond a doubt that no simple relation exists between the number of turns a globe valve is opened and the amount of steam which passes in a given time. Some better control of the steam is evidently necessary. This is to be found in the nozzle pressure appliances which are attached to most water gas machines. Rankine after a consideration of Napier's work on the subject, gives the following empirical formulæ for the amount of saturated steam escaping from a chamber where the pressure is p, through a short pipe and nozzle into a space where the pressure is p_a:

(1) Where $p =$ or $> \frac{5}{8} p_a$, $w = \frac{ap}{70}$

(2) Where $p < \frac{5}{8} p_a$, $w = \frac{ap_a}{42}\left(\frac{3\,(p-p_a)}{2\,p_a}\right)^{\frac{1}{2}}$.

In the above formulæ, $w =$ the number of pounds of steam delivered per second and a is the area of the orifice in square inches. In water gas practice conditions are somewhat different from the experiments on which the above formulæ were established, insomuch as we have a long steam line, and take the nozzle pressure, not from the boiler, but between the steam valve and the nozzle, at a point past which the steam is moving rapidly. If we apply the above formula, taking p as the indicated nozzle pressure, then $p = 30$ to 40 pounds per square inch, while p_a is measured in a few inches water pressure, and the first formula applies; from which it follows that the amount of steam delivered in a given time varies directly with the nozzle pressure, and also directly with the area of the orifice. A series of experiments testing the accuracy of the above formula under water gas conditions would be interesting.

From actual experiments carried out, extending over more than a month, in which the nozzle pressure was cut down by one-half after the fourth minute, a considerable saving in coke was effected, and the composition of the gas was in a measure modified also, its carbon dioxide contents being lowered. Under this system of working the gas and steam curves would resemble Fig. 5, though a curve of this kind was not actually taken from the machines. The above remarks apply where gas coke is used in the generators; modifications may be expected in the case where anthracite coal is employed. From the curves just after clinkering, it is apparent that the machine's capacity could be increased by dividing the blow into three periods, and cutting the steam down to one-third each time. It being possible, therefore, to approximately regulate the amount of steam admitted during the run in accordance with the curves obtained, the yield of gas is increased, and the machine can be run up to its highest efficiency, owing to the fact that the conditions causing imperfect working, indicated under (*a*), (*b*), etc., no longer exist.

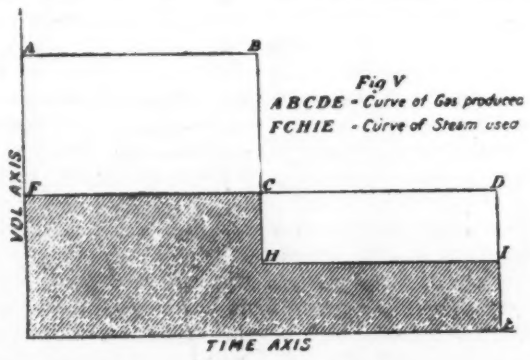


Fig V
ABCDE - Curve of Gas produced
FCHIE - Curve of Steam used

The author wishes to acknowledge his indebtedness to Professor W. R. Lang, of the University of Toronto, for his advice and assistance rendered in collating his experimental results.

Alaska's Petroleum Future.

According to the annual report of the Governor of Alaska, the greatest interest in natural development there during the past twelvemonth had connection with matters related to Alaska's oil fields. The report states: There seems to be seepage of oil all the way from Yakutat west through the Alaska Peninsula, and almost the whole shore line has been staked.

The main interest is centered on the mainland along Controllers' bay. One Company, locally known as the "English Company," is the pioneer, and others have followed in its steps. Last year this Company drilled a well to 365 feet and had oil shooting to beyond the tops of the derricks. It was finally put under control and this year it undertook to sink the hole deeper, but did not meet with success. The last report is that it has perforated the casing at the depth where the oil first flowed—namely, 365 feet—and started to pumping, but after a while the pressure of the gas now causes the oil to flow at the rate of 40 barrels a day, and it is managing to take care of the oil as it flows. The oil is said to be worth $3 a barrel right on the ground where it is taken. It seems to stand the test well, has what is called a paraffine basis, and is regarded as the best oil on the continent of America.

It is noticed that this year oil experts and men skilled in the business from every quarter have visited these locations and are still on the ground. A number of machines are at work, and, while no gushers have been struck, every oil man seems to feel it in his bones that the country is a great oil district. They say the formations are right, the seepages can be trusted, and that the gas which comes from the boring is a good indication that the coal formations are no detriment.

There is no doubt that during the coming year there will be a very great outlay in the attempt to strike these oil beds by drilling. The possibilities which are before us along those shores, which Captain Cook touched in 1778, and named the island Kayes Island, after a good old English canon, are wonderful in the extreme. It will surely be within the bounds of the possible that inside the next 20 years a large city will be built up as the result of the development of these two products which the world needs so much, coal and oil.

There is a considerable abundance of fair timber and good water power, which can be utilized in most of the places, so that the winter temperature is not severe, although the snow fall in some seasons is very considerable. If the real material is there, there can be no doubt as to the future greatness of that part of the coast of Alaska.

Locations for oil have been made upon the Kenal Peninsula, and at several places upon the Alaska Peninsula there have been locations, and one firm is bravely at work at Cold Bay, where the seepages and indications seem to be quite as favorable of those seen near Kayak. Wells have been driven near Iliamna, but we have no information with regard to their success.

There is a universal cry by the miners of Alaska against the abuse of locating mining and other claims by power of attorney. This is carried on to such an extent that pretty soon there will be hardly any area left in Alaska for exploration; as witness what was stated above in regard to oil locations at Yakutat, where two men located 51,200 acres of land under the placer mining act. It is hardly possible that they have even driven the stakes upon that amount of land, yet they have recorded it, and it is sufficient to deter others from going upon it and exploring it.

Now, this kind of thing has been going on all along the southern coast of Alaska, making locations for oil and coal, and all through the placer regions. When men the past winter rushed to the Tanana, at

great labor and expense, they found the whole region staked, and nothing but a feeling of disgust came over them.

For instance, of those who recorded claims at Sitka, two men have recorded 230 claims of 160 acres each, being eight locators on each claim. This was done by the two men locating for themselves, and for 24 others as attorneys. Another man recorded 63 claims of 160 acres each for himself and as attorney for about 30 others. Still another man recorded two claims of 160 acres each for himself and as attorney for others. These claims are taken up under the placer miners' law.

Congress should at once remedy this kind of abuse. Prospectors who make discoveries have, of course, the right to take the choice of location, and all miners are willing that they should be allowed to make an additional location as a reward for their discovery. Those people who outfit prospectors should expect to have no other reward than to share in the claims which the prospector is allowed to have. Now a man comes here armed with a load of powers of attorney legally executed and can go into a district and tie it all up for a couple of years. This produces discontent.

The placer mining law of allowing 20 acres to the claim is liberal enough, but before the man records such claim he should make affidavit to the recorder that he has discovered the kind of mineral upon it for which he records it.

Congress will receive the thanks of all the miners and fair minded people if it will amend the laws to cure this evil during the coming season.

In former reports it has been urged that a mining commissioner, with a proper number of assistants, be provided by law. Congress provides for two special agents to look after the salmon fisheries; for years we have had special agents looking after the fur seal industry; we have an agricultural agent, and are establishing stations, as is eminently proper; the Interior Department can send its agents to look after timber and lands, but, while we are rightly doing these things, we let the mining industry severely alone. If a stranger comes into the country seeking information, he cannot be directed to any Government office where he can obtain accurate and reliable information on the mining enterprises in this district. But if he should stop at Victoria, British Columbia, and make the same kind of inquiry, he would be directed to the office of the Minister of Mines, where he could learn every important fact concerning any kind of mining in any district of the Province. The annual reports of that officer are masterpieces in the line of printed information and illustrations. Surely the time has come when a similar kind of work should be inaugurated here.

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remove broken pieces of taps comparatively quickly and with little difficulty as compared to ordinary methods. The device consists of a cylindrical holder, whose diameter is substantially equal to the diameter of the tapped hole, and which is provided with a squared section for the application of a wrench at the outer end. This holder has four longitudinal grooves corresponding to the flutes of the tap. These grooves in the holder are fitted with four long sliding tap engaging bars, whose outer ends are attached to a sliding collar by means of which they are movable lengthwise of the cylindrical holder. Between this collar and the working end of the grooved holder is a loose sleeve, which is to be slid along the holder close down to the work, after the tap engaging bars have been properly inserted into the flutes of the broken tap. This sleeve when thus placed close to the work, as shown in the illustration, effectively holds the tap engaging bars securely in their respective grooves in the holder at the nearest possible point to that at which the strain comes. The device thus properly placed in position, the application of a wrench to the squared end of the holder enables the operator to remove readily the broken tap by backing it out of the tapped hole.

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Wood's Water Gauge.

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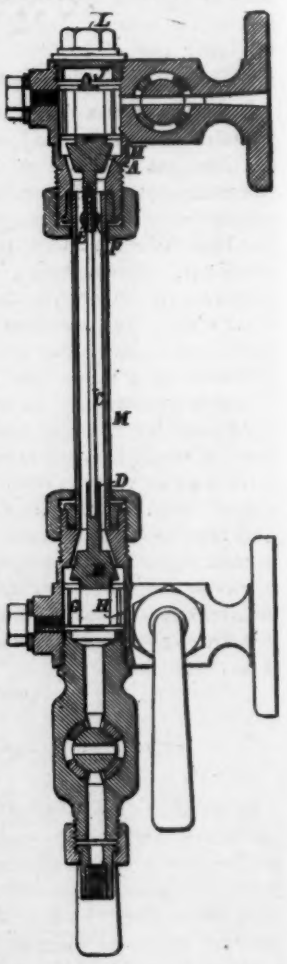
The risks that are run by boiler attendants, due to the fracture of gauge glasses, particularly in these days of using high pressure steam, are clearly recognized by engineers, who have from time to time devised various automatic arrangements whereby the steam and water may be cut off in case of accident. Herewith we illustrate the Wood device, the object of which, like that of all similar devices, is to automatically prevent the escape of water and steam from a boiler should the gauge glass be accidentally broken. In the case of the water gauge before us, the object is attained by a simple and ingenious method of holding steam and water valves apart during normal conditions by means of a thin glass rod, which is fixed at the top to the steam valve and at the bottom to the water valve, and is sufficiently strong under normal conditions to keep the two valves off their seatings. The rod is of small diameter and passes centrally inside the gauge glass from top to bottom, and there is ample room for the free flow of steam and water round it. Should the gauge glass be accidentally broken, the pressure of steam and water on the two valves at once fractures the thin glass rod, and the valves are forced on their seatings. If the gauge glass should break without the internal rod collapsing, the latter can easily be broken with any handy instrument. This, however, is not likely to occur.



The construction of the apparatus will be better understood on reference to the figure. *A* and *B* are the two conical valves, which are held apart by the rod *C*, which at its lower end is inserted into a socket *D*, which is a continuation of the valve *B*, while at the top it is inserted in a split, externally screwed and slightly tapered socket *E*, made on an extension of the valve *A*. A small nut *F* is screwed on this extension so as to tighten the latter and cause it to grip the rod *C*. An open guide frame *G* is secured to each valve, and this frame slides in the cylindrical passage *H*, and forms a guide for the valve. The upper guide frame is provided with a small knob *J*, by means of which the valve *A*, the rod *C* and the valve *B* can be withdrawn out of place after the cap *L* has been removed. If desired, the valves can have ordinary radial webs for the purpose of guiding them.

It has been found that with a working pressure of 100 pounds per square inch, a glass rod ¼ inch in diameter is sufficient to hold the valves open under normal conditions.

Fire Hazard an Element in Manufacturing Costs.

By Mr. H. D. Gue, in *Iron Age*.

It may be stated roughly that a manufacturer's profit earning capacity is in due proportion to his knowledge of factory costs and his ability to stop the leaks; to the ingenuity with which he collects and tabulates the smallest details of his plant and its operation, and the promptness with which the errors thus shown are rectified. The past 10 years have shown tremendous impetus given to an investigation of this subject, the work having found expression in technical journals generally. The cost of many of the standard articles of manufacture is known to within one-tenth of 1 per cent., and it is hardly an exaggeration to say that the doing away with a single screw in a piece of mechanism may render it a commercial possibility.

In spite of this, refinement of business management can scarcely come from any but continuous work, and it is beyond question that too many manufacturers fail to appreciate the all-embracing importance which the fire hazard plays in the conduct of their business. Interruptions in the output of individual factories, especially if of considerable duration and at a time when rivals are busy, are always serious. Trade is diverted, workmen disperse, and the entire organization is temporarily if not permanently crippled. But two things are apt to tend to such a condition; a long strike or a serious fire. Strikes may or may not be avoided. The fire hazard, on the other hand, may be reduced materially in nearly every factory in the land. It may be reduced to a point in fact where the probability, not that a fire will not start, but that the resultant loss will be insignificant is made almost a certainty. Plans and specifications for bringing about such a result are already in existence, and may be had by any manufacturer for the asking.

The indemnity feature of fire insurance, representing, as it does, the co-operation of the many for the benefit of the few, and in such protection distributing yearly to the few above $150,000,000 collected from the many, is absolutely essential to the transaction of business and the extension of credit. The permanent and lasting value of fire insurance organization lies, however, in the concerted work thus made possible to reduce the fire hazard.

Few other national questions concern us so deeply as the reduction of our fire waste, amo unting annually to upward of $200,000,000, while surely no other na tional question of anything like equal importance is given such grudging attention on the part of those most vitally interested—the owners and occupants of buildings. Part of the difference is due, no doubt, to an active reluctance to conform to any suggestions or requirements of underwriters. The principal cause, however, lies in a failure to take with due seriousness the educational work of fire insurance engineers.

The foundation of modern fire insurance may be stated briefly as follows: A contract for fire insurance indemnity is made for a premium consideration, based on the general likelihood of fire loss occurring under conditions similar to those in the particular risk insured. In other words, although not strictly accurate, fire insurance costs in proportion to the likelihood of fire loss in so far as underwriters have been able to solve this enormously difficult and complex question.

Fire insurance engineers have gone to great pains in tabulating the causes and effects of fire, together with the strength or weakness of contributing details, and to-day underwriters are so sure of these results that they will vary between wide limits the premium charged for a given amount of indemnity, depending on how near the owner will bring his proper'y up to the standard of safety set by the underwriter. Some of these improvements bear a splendid interest in the reduction of the premium rate on the investment; others make but a meager return, yet are of no small value when the greatest security is desired.

Until very recent years it was customary to class many items of factory expense in the category of "fixed expenses," which are now subject to more or less steady decline, as systematic care is brought into effect. Under the present system of schedule rating, fire insurance is no longer a fixed expense. It is determinable largely at will. It depends to a gr eat extent on the adoption of features of construction and types of perfection advised by fire underwriters. As such it is a variable increment of factory cost, while the protection which fire insurance engineering can now afford against interruption and loss, and the degree of confidence which it brings through the lessening of future uncertainties, though not easily expressed in dollars and cents, lend a measure of courage deserving of a prominent place in the assets and earning capacity of the factory.

It is impossible to detail here the various ways and means which may be adopted to reduce the fire hazard in any given risk. Fire insurance engineering has brought out some very valuable general facts. For example: Vertical openings from floor to floor are more to be feared than any other feature of construction; unprotected iron is far less fire resistant than heavy wood; outside windows may be protected by tin clad wooden shutters or windows of wire glass, and nearly one-third of the total fire loss eliminated; textile mills formerly so dangerous that insurance was difficult to get at any rate, are now, largely through the introduction of the automatic sprinkler, among the safest of structures, etc.

Many manufacturers have taken advantage of all that underwriters have to offer in their construction of recent factories, and the results are subjects for congratulation. Among these may be cited the works of the Westinghouse Electric and Mfg. Company, the Brown Hoisting Machinery Company and the Allis-Chalmers Company. If improvements tending to reduce the fire loss are given such thorough recognition by fire underwriters, who have only property damage to consider, how much more must be the concern of the factory owner, who faces not only property loss, but interruption or divergence of trade, and all the train of misadventures which follow an unexpected shut down?

The Grounded Neutral.

By Mr. R. S. Hale, in *Elec. Engr.*

Whether the grounded neutral is an advantage, as now seems to be the general opinion, or whether it is a disadvantage as some people would still try to make us believe, it is a condition and not a theory that confronts us in the Edison 3-wire direct current systems in the great cities of the country. The neutrals of these systems are so thoroughly grounded that it would probably be impossible to insulate them even if it should be attempted. Since they are grounded the electrical condition is different from the small insulated 2-wire or 3-wire systems with ground detectors on the switchboard that formed the earliest type of electrical distribution, and why should we not take advantage of this difference? There are four ways in which the wiring on a 3-wire system with grounded neutral can be done more cheaply and as safely or more safely than at present, and these are as follows:

First, the use of single pole switches instead of double pole; second, the use of single pole cutouts instead of double pole; third, the consolidation of the neutrals when there are several circuits side by side; and fourth, the use of a cheaper insulation or no insulation on the neutral.

First, in regard to the switches, let us consider the electrical condition of the circuits when in use and when disconnected. We need consider only the plus side since the conditions on the negative side will be practically the same.

When the circuit is connected the plus side is at 110 volts at all points (neglecting drop), the neutral is at zero potential at all points (again neglecting drop) and is solidly connected to the ground in the street. Inside the house the neutral is, according to present practice, insulated, but when the circuit is in use the neutral inside the house is connected to the ground through the switch and outside neutral.

When the circuit is not in use, the neutral inside the house is (if a double pole pole switch is used) disconnected from everything, and there is a possibility that it might be crossed with some high potential circuit, in which case this cross would not be discovered until some one touched either the neutral or positive inside the house, or until the circuit was again put in use. This obviously is a more dangerous condition of affairs than if the neutral inside the house were connected to ground at all times. The argument is easily recognized as the usual one in favor of a grounded neutral, and while a cross with high tension wires is less probable inside the house than out, yet it is a possibility and should be guarded against if there is no accompanying disadvantage in the means used for protection.

That there is no disadvantage in having the neutral inside the house connected to ground at all times, is easily seen when we remember that the water pipes and gas pipes inside the house are solidly connected to ground at all times and hence also to the neutral wire in the street; and that if the neutral inside the house were connected to ground at all times it would be in exactly the same electrical condition as these same bare pipes.

The advantage of breaking the circuit at both poles, as with a double pole, instead of at a single pole switch, might seem to be in favor of the double pole switch, but a single pole switch with a break distance equivalent to a double pole switch is much cheaper than the latter, and takes up much less room and is much less liable to get out of order. In case the neutral should be accidentally grounded inside the house, the positive side of the double pole switch is the only side that breaks the current, while a single pole switch of break distance equivalent to the double pole would always be fully effective.

Next in regard to the cutouts. If a double pole cutout is installed, both sides are effective in case of a short circuit between the two wires of the circuit. It is only the positive cutout, however, that is effective in case of a short circuit between the positive wire and the ground, which gives a worse short circuit than between the two wires. Hence, if the cutout on the positive side is sufficient for the worst case, why go to the expense of a cutout that will be no more effective and will operate only in a few of the less dangerous cases? If, however, it is felt that the second cutout is desirable, why not put it in series with the first cutout, but put both on the positive leg where both will always be effective? It should be noted that if there should be an accidental ground on the neutral inside the house, the neutral cutout is of no use whatsoever.

great labor and expense, they found the whole region staked, and nothing but a feeling of disgust came over them.

For instance, of those who recorded claims at Sitka, two men have recorded 230 claims of 160 acres each, being eight locators on each claim. This was done by the two men locating for themselves, and for 24 others as attorneys. Another man recorded 63 claims of 160 acres each for himself and as attorney for about 30 others. Still another man recorded two claims of 160 acres each for himself and as attorney for others. These claims are taken up under the placer miners' law.

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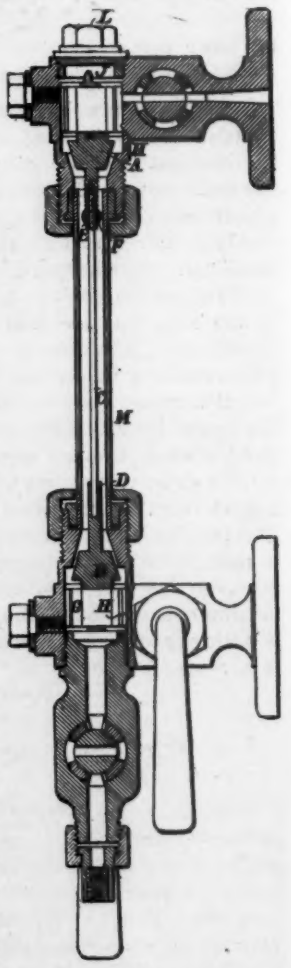
The risks that are run by boiler attendants, due to the fracture of gauge glasses, particularly in these days of using high pressure steam, are clearly recognized by engineers, who have from time to time devised various automatic arrangements whereby the steam and water may be cut off in case of accident. Herewith we illustrate the Wood device, the object of which, like that of all similar devices, is to automatically prevent the escape of water and steam from a boiler should the gauge glass be accidentally broken. In the case of the water gauge before us, the object is attained by a simple and ingenious method of holding steam and water valves apart during normal conditions by means of a thin glass rod, which is fixed at the top to the steam valve and at the bottom to the water valve, and is sufficiently strong under normal conditions to keep the two valves off their seatings. The rod is of small diameter and passes centrally inside the gauge glass from top to bottom, and there is ample room for the free flow of steam and water round it. Should the gauge glass be accidentally broken, the pressure of steam and water on the two valves at once fractures the thin glass rod, and the valves are forced on their seatings. If the gauge glass should break without the internal rod collapsing, the latter can easily be broken with any handy instrument. This, however, is not likely to occur.



The construction of the apparatus will be better understood on reference to the figure. *A* and *B* are the two conical valves, which are held apart by the rod *C*, which at its lower end is inserted into a socket *D*, which is a continuation of the valve *B*, while at the top it is inserted in a split, externally screwed and slightly tapered socket *E*, made on an extension of the valve *A*. A small nut *F* is screwed on this extension so as to tighten the latter and cause it to grip the rod *C*. An open guide frame *G* is secured to each valve, and this frame slides in the cylindrical passage *H*, and forms a guide for the valve. The upper guide frame is provided with a small knob *J*, by means of which the valve *A*, the rod *C* and the valve *B* can be withdrawn out of place after the cap *L* has been removed. If desired, the valves can have ordinary radial webs for the purpose of guiding them.

It has been found that with a working pressure of 100 pounds per square inch, a glass rod ¼ inch in diameter is sufficient to hold the valves open under normal conditions.

Fire Hazard an Element in Manufacturing Costs.

By Mr. H. D. Gue, in *Iron Age*.

It may be stated roughly that a manufacturer's profit earning capacity is in due proportion to his knowledge of factory costs and his ability to stop the leaks; to the ingenuity with which he collects and tabulates the smallest details of his plant and its operation, and the promptness with which the errors thus shown are rectified. The past 10 years have shown tremendous impetus given to an investigation of this subject, the work having found expression in technical journals generally. The cost of many of the standard articles of manufacture is known to within one-tenth of 1 per cent., and it is hardly an exaggeration to say that the doing away with a single screw in a piece of mechanism may render it a commercial possibility.

In spite of this, refinement of business management can scarcely come from any but continuous work, and it is beyond question that too many manufacturers fail to appreciate the all-embracing importance which the fire hazard plays in the conduct of their business. Interruptions in the output of individual factories, especially if of considerable duration and at a time when rivals are busy, are always serious. Trade is diverted, workmen disperse, and the entire organization is temporarily if not permanently crippled. But two things are apt to tend to such a condition; a long strike or a serious fire. Strikes may or may not be avoided. The fire hazard, on the other hand, may be reduced materially in nearly every factory in the land. It may be reduced to a point in fact where the probability, not that a fire will not start, but that the resultant loss will be insignificant is made almost a certainty. Plans and specifications for bringing about such a result are already in existence, and may be had by any manufacturer for the asking.

The indemnity feature of fire insurance, representing, as it does, the co-operation of the many for the benefit of the few, and in such protection distributing yearly to the few above $150,000,000 collected from the many, is absolutely essential to the transaction of business and the extension of credit. The permanent and lasting value of fire insurance organization lies, however, in the concerted work thus made possible to reduce the fire hazard.

Few other national questions concern us so deeply as the reduction of our fire waste, amo unting annually to upward of $200,000,000, while surely no other na tional question of anything like equal importance is given such grudging attention on the part of those most vitally interested—the owners and occupants of buildings. Part of the difference is due, no doubt, to an active reluctance to conform to any suggestions or requirements of underwriters. The principal cause, however, lies in a failure to take with due seriousness the educational work of fire insurance engineers.

The foundation of modern fire insurance may be stated briefly as follows: A contract for fire insurance indemnity is made for a premium consideration, based on the general likelihood of fire loss occurring under conditions similar to those in the particular risk insured. In other words, although not strictly accurate, fire insurance costs in proportion to the likelihood of fire loss in so far as underwriters have been able to solve this enormously difficult and complex question.

Fire insurance engineers have gone to great pains in tabulating the causes and effects of fire, together with the strength or weakness of contributing details, and to-day underwriters are so sure of these results that they will vary between wide limits the premium charged for a given amount of indemnity, depending on how near the owner will bring his proper'y up to the standard of safety set by the underwriter. Some of these improvements bear a splendid interest in the reduction of the premium rate on the investment; others make but a meager return, yet are of no small value when the greatest security is desired.

Until very recent years it was customary to class many items of factory expense in the category of "fixed expenses," which are now subject to more or less steady decline, as systematic care is brought into effect. Under the present system of schedule rating, fire insurance is no longer a fixed expense. It is determinable largely at will. It depends to a great extent on the adoption of features of construction and types of perfection advised by fire underwriters. As such it is a variable increment of factory cost, while the protection which fire insurance engineering can now afford against interruption and loss, and the degree of confidence which it brings through the lessening of future uncertainties, though not easily expressed in dollars and cents, lend a measure of courage deserving of a prominent place in the assets and earning capacity of the factory.

It is impossible to detail here the various ways and means which may be adopted to reduce the fire hazard in any given risk. Fire insurance engineering has brought out some very valuable general facts. For example: Vertical openings from floor to floor are more to be feared than any other feature of construction; unprotected iron is far less fire resistant than heavy wood; outside windows may be protected by tin clad wooden shutters or windows of wire glass, and nearly one-third of the total fire loss eliminated; textile mills formerly so dangerous that insurance was difficult to get at any rate, are now, largely through the introduction of the automatic sprinkler, among the safest of structures, etc.

Many manufacturers have taken advantage of all that underwriters have to offer in their construction of recent factories, and the results are subjects for congratulation. Among these may be cited the works of the Westinghouse Electric and Mfg. Company, the Brown Hoisting Machinery Company and the Allis-Chalmers Company. If improvements tending to reduce the fire loss are given such thorough recognition by fire underwriters, who have only property damage to consider, how much more must be the concern of the factory owner, who faces not only property loss, but interruption or divergence of trade, and all the train of misadventures which follow an unexpected shut down?

The Grounded Neutral.

By Mr. R. S. Hale, in *Elec. Engr.*

Whether the grounded neutral is an advantage, as now seems to be the general opinion, or whether it is a disadvantage as some people would still try to make us believe, it is a condition and not a theory that confronts us in the Edison 3-wire direct current systems in the great cities of the country. The neutrals of these systems are so thoroughly grounded that it would probably be impossible to insulate them even if it should be attempted. Since they are grounded the electrical condition is different from the small insulated 2-wire or 3-wire systems with ground detectors on the switchboard that formed the earliest type of electrical distribution, and why should we not take advantage of this difference? There are four ways in which the wiring on a 3-wire system with grounded neutral can be done more cheaply and as safely or more safely than at present, and these are as follows:

First, the use of single pole switches instead of double pole; second, the use of single pole cutouts instead of double pole; third, the consolidation of the neutrals when there are several circuits side by side; and fourth, the use of a cheaper insulation or no insulation on the neutral.

First, in regard to the switches, let us consider the electrical condition of the circuits when in use and when disconnected. We need consider only the plus side since the conditions on the negative side will be practically the same.

When the circuit is connected the plus side is at 110 volts at all points (neglecting drop), the neutral is at zero potential at all points (again neglecting drop) and is solidly connected to the ground in the street. Inside the house the neutral is, according to present practice, insulated, but when the circuit is in use the neutral inside the house is connected to the ground through the switch and outside neutral.

When the circuit is not in use, the neutral inside the house is (if a double pole pole switch is used) disconnected from everything, and there is a possibility that it might be crossed with some high potential circuit, in which case this cross would not be discovered until some one touched either the neutral or positive inside the house, or until the circuit was again put in use. This obviously is a more dangerous condition of affairs than if the neutral inside the house were connected to ground at all times. The argument is easily recognized as the usual one in favor of a grounded neutral, and while a cross with high tension wires is less probable inside the house than out, yet it is a possibility and should be guarded against if there is no accompanying disadvantage in the means used for protection.

That there is no disadvantage in having the neutral inside the house connected to ground at all times, is easily seen when we remember that the water pipes and gas pipes inside the house are solidly connected to ground at all times and hence also to the neutral wire in the street; and that if the neutral inside the house were connected to ground at all times it would be in exactly the same electrical condition as these same bare pipes.

The advantage of breaking the circuit at both poles, as with a double pole, instead of at a single pole switch, might seem to be in favor of the double pole switch, but a single pole switch with a break distance equivalent to a double pole switch is much cheaper than the latter, and takes up much less room and is much less liable to get out of order. In case the neutral should be accidentally grounded inside the house, the positive side of the double pole switch is the only side that breaks the current, while a single pole switch of break distance equivalent to the double pole would always be fully effective.

Next in regard to the cutouts. If a double pole cutout is installed, both sides are effective in case of a short circuit between the two wires of the circuit. It is only the positive cutout, however, that is effective in case of a short circuit between the positive wire and the ground, which gives a worse short circuit than between the two wires. Hence, if the cutout on the positive side is sufficient for the worst case, why go to the expense of a cutout that will be no more effective and will operate only in a few of the less dangerous cases? If, however, it is felt that the second cutout is desirable, why not put it in series with the first cutout, but put both on the positive leg where both will always be effective? It should be noted that if there should be an accidental ground on the neutral inside the house, the neutral cutout is of no use whatsoever.

Third, in regard to consolidation of neutrals, frequently two circuits will be run side by side, as for instance the circuit for the public lights in the hall of a building and the circuits for the tenants. At present separate neutrals are run for each of these. Two No. 14 wires, however, cost much more than a single No. 10, which is rated at the same carrying capacity as the two smaller wires, and would operate much better, since there would be less drop in the neutral in case of unbalancing of either circuit, and would be better in practically every way.

There is, of course, one case in which the single pole switch or single pole cutout, etc., might cause trouble, but it is a case which never occurs in house wiring, and should never occur in any wiring. The case referred to is when it is attempted to save copper by using a neutral smaller than the others. In such case opening the single pole switch or blowing the single cutout might throw a current on the neutral greater than its carrying capacity. Even in this case the cutout on the neutral is a questionable advantage, since if one side of the circuit should be so overloaded as to blow the neutral fuse only, then nearly the whole pressure between the outers, say 150 or 200, or even 220 volts might be thrown on one side of the house wiring, and would be fully as dangerous a condition as if there had been no neutral fuse.

Fourth, in regard to the use of a cheaper insulation or bare wire for the neutral, in the old fashioned system of insulated circuits there was as much reason for insulating the return as the outgoing wire. In the modern system, however, with grounded neutral, the electrical pressure on the neutral can never be over a few volts, hence a much cheaper insulation gives an equal factor of safety for all purposes. In fact, when we remember that the gas pipes and water pipes and steam pipe system are in exactly the same electrical condition as the neutral, since they are solidly connected to the neutral outside the house, there would seem to be but little argument for insulating the neutral so carefully inside the house.

The insurance rules were made up at the time when the insulated systems were the rule, and their requirements for double pole switches, double pole cutouts, separate neutrals for all circuits and for complete insulation on the neutral inside the house are a relic of the old days. The requirements for double pole switches and double pole cutouts perhaps had a basis also in the added safety of an extra break on the switch, and an extra fuse to protect in case of some short circuits; but as has been shown above, the same safety can be secured more efficiently and cheaper by putting the extra brake distance and the second fuse on the positive wire. That the insurance rule is a relic of the old days and is not based on any sound insurance or electrical reason is shown by the other insurance rule that does permit a single pole switch on circuits carrying a small number of lights, with, however, no rule as to whether this switch shall be placed on the neutral or on the wire that has the current at the full main pressure. If such single pole switch is placed on the main wire, the situation is just as recommended above, and the only reason for not extending it to larger circuits would seem to be the question of an efficient single pole switch, which can be easily taken care of at a less expense than the present double pole switch. If, however, the single pole switch on these small circuits be placed on the neutral, as is allowed by the present rules, and as is frequently done, then we have a very dangerous condition of affairs, since when the switch is open the ordinary tests, as for instance, screwing in a lamp, would indicate no current on the circuit, while grounding any part of it, either main wire or neutral, would give at least a spark and in some cases a short circuit.

It is suggested, therefore, that with a view to greater safety and a very considerable saving in expense, that the insurance rules should require that in all connections to any 3-wire system with grounded neutral, the neutral wire should be a solid connection at all points with no cutouts or switches whatsoever, from the neutral wire in the street up to the lamp or current consuming device.

In order to make the switches and cutouts equally efficient with the present installation in all cases (they would be much more efficient in most cases) it might be required than when the neutral is thus made solid, then on 110-volt systems only the switches and cutouts now allowed for 250-volt systems be allowed, and that on 250-volt systems only the switches and cutouts now allowed for 500 volts be permitted.

The rules should also be changed so that whenever a neutral wire is installed under such conditions that the maximum difference in pressure between it and ground does not exceed, say, 10 volts (this would be due only to drop), then only such insulation be required as is now required on bell wiring and similar systems with a corresponding maximum potential.

These changes will, as has been shown, give at least equal safety to the present rules, and in some cases be much safer. They will reduce by a considerable percentage the cost of wiring, which is still the greatest obstacle to the introduction of electric light. Therefore, why cannot the electric companies and insurance companies arrange to take advantage of the situation as it actually exists, rather than cling to obsolete rules based on conditions that are obsolete for all the great electric installations?

In regard to this matter, I may say that I recently installed an isolated plant, and for this installation I obtained as a special case from the insurance office that had jurisdiction permission to use grounded neutral, single pole switches, single pole cutouts, and to consolidate the neutral in several places, thereby saving in all several hundred dollars. The question of using a bare neutral was also spoken of, but in this case of factory work the difference in cost between bare wire and the ordinary wire permitted for all the work was so slight that I did not press the point. If rubber covered wire had been required for the main wires, I think that I could have obtained permission to use a much cheaper grade of wire for the neutral. This installation has given no trouble in any way that I have heard of.

A Great Japanese Coal Company.

According to the *Engineering and Mining Journal*, the Hokkaido Tanko Tetsudo Kaisha is one of the larger and more important coal mining companies in Japan; it is, indeed, one of the great coal producers of the East, and promises to become the largest. Its operations are set forth in a report recently issued, which comes down to the end of 1902. This report is clear, definite and full of interesting detail. It might well serve as a model for many American companies in making their reports.

We give below a summary of that portion relating to mining. In addition, there is much interesting matter relating to the geography and history of Hokkaido, its population, timber, railroads and agricultural resources, for which we have not space here.

The Company operates in the island of Hokkaido, which is in the northeast of Japan, and includes about one-fifth of the whole area of the Empire. This large island is the latest settled portion of Japan, and is not yet fully explored. It is rich in mineral wealth, especially coal. The Company owns, as shown below, several large mines; the railroads connecting the mines with Mororan and Otaru, the chief ports of the island; lands, stations, storage depots and wharves at those ports.

Examinations made by several mining engineers put the quantity of workable coal in the Company's mines at somewhat over 250,000,000 tons. In addition, it controls part of the Mukawa and Rumoye coal fields, which are as yet untested.

The output of coal has increased from 303,085 tons in 1893, to 859,883 tons in 1902.

The Hokkaido Tanko Tetsudo Kaisha was organized in 1889, with a capital of 6,500,000 yen. It purchased from the government the Poronai railway (from Otaru to the Poronai mine via Iwamizawa) and the Poronai coal mine, the former for 247,950 yen and the latter for 104,368 yen, figures scarcely representing one-tenth of the sums that had been expended on these properties. Subsequently the Ikushunbetsu coal mine was acquired, and mines were opened at Sorachi and Yubari. Further, a railway was projected and constructed, starting from the port of Mororan and running to Sorachibuto via Iwamizawa, with branches to the Sorachi and Yubari mines. The Government assisted the Company by granting a subsidy of 5 per cent. up to the end of 1899 on all capital invested in its new railways.

The capital of the Company, originally 6,500,000 yen, has been gradually increased to 18,000,000 yen, in shares of 50 yen each. The Company has also debentures to the amount of 1,596,700 yen outstanding. The Company has for several years paid dividends varying from 24 to 30 per cent.

The principal officers are Mr. Kiyotsugu Yonekura, Chief Engineer of Coal Department; Mr. Yeiichiro Homma, Chief Engineer of Railway Department; Mr. Tsuruta Uno, Manager of General Business Department, and Mr. Momosuke Fukuzawa, Manager of Tokyo office. The head office of the Company is in Sapporo, Hokkaido, where all of the engineering, mining and railway businesses are attended to. The Company has many branch offices, the principal one being in Tokyo, where Mr. Kakugoro Inouye, the Chief Director, spends most of his time, and where the sale of coal and matters in connection with the shares of the Company are conducted under his personal supervision.

In addition to the business of railway transportation, the Company mines and sells coal, manufactures coke and runs steamers. The laws of Japan do not permit a railway company to engage in any other business, but the Tanko Tetsudo Kaisha is specially privileged in that re-

spect. The railways owned and operated by the Company total 212 miles in length. One starts from Otaru, on the northwest coast, another from Mororan, on the southeast coast, and meeting at Iwamizawa, they run northward to Sorachibuto, where the line connects with the Imperial Government railway. There are branches to all the coal mines worked by the Company, so that the mineral can be transported direct to the ports of Otaru and Mororan. The supply of coal in Hokkaido is practically inexhaustible, and the principal coal fields, those of Sorachi, Yubari, Mukawa and Rumoye, belong in the main to the Company. At present the mines actually worked are at Yubari, Sorachi, Peronai and Ikushunbetsu. The Company owns and charters many steamers and vessels for the carriage of coal and general cargo. It has also a number of steam launches and lighters at Otaru, Mororan, Tokyo and Yokohama, which are used for purposes of loading and discharging. The coke plant at Oiwake is now completed and excellent coke is produced.

Descriptions of the Company's coal mines and coke plant are given below:

The Yubari mine is situated at Nobori-kawa, in Ishikari province. It is on the southern end of the Ishikari coal field, and the concession covers 5,795,172 tsubo (about 4,829 acres).

In 1876, the Colonization Bureau employed an American geologist, Mr. Lyman, to make geological investigations in Hokkaido. He reported that good coal existed at Yubari, but that the district was rough and difficult of access. For abont 10 years the matter was left in abeyance, but, in the autumn of 1889, a geologist employed by the Government proceeded for the first time to Nobori-kawa in order to make investigations. He found outcrops of coal between small streams of water, and from that time the Yubari mine acquired a high reputation. In December, 1890, the Company obtained official permission to exploit these deposits, and having constructed a railway communicating with the mine, commenced operations in 1892. The seams proved extraordinarily thick, the first being 25 feet in thickness, and the second and third 4 feet each. Such thick seams have not been found elsewhere in Japan. As for the quality of the mineral, it is a bituminous coking coal, solid, of full combustible and large calorific power, being thus a first-class fuel for all purposes, especially for steamers, gas making and iron smelting works.

To work the seam above drainage level, entry levels are driven, but for working below drainage level, shafts or slopes are opened for winding, ventilation and draining. In both cases, to open the working face is to drive the level (8 feet high by 10 feet wide), then the next level (7 feet high by 7 feet wide) is opened from 20 feet to 30 feet above the former, and both are connected by thirlways about 50 feet apart. The face is 15 feet to 20 feet wide by 8 feet high, being worked with a slight incline, to facilitate transportation, and after being driven on the incline for a prescribed distance, a return is made in the workings, when the roof coal is taken out to 10 feet in thickness, and the pillars removed.

The air current is divided into sections of 500 feet by 1,000 feet, each section being separated from the others by doors, thus minimizing any danger from explosion or fire. Ingersoll-Sergeant coal cutters driven by compressed air are in use in one part of the mine and have proved very efficient.

The water from the mine is all collected at No. 1 slope where 4 pumps are established, two of them at 500 feet below the pit and the other two at 500 feet further. They are all of the Cornish type, having, at present, a capacity of pumping 30 cubic feet of water per minute. Eight fans, run by steam and electricity, are used for ventilation. No naked light is permitted within a shaft except such as is absolutely safe—the Davy and the Clanny lamps, for example, fed with pure white oil.

For transporting the mineral, single and double lines of rails and 4-wheeled cars are employed. Since January, 1900, compressed air engines, manufactured by the H. K. Porter Company, have been in use on these lines. These engines, being of an invariable type as to shape, height, length (14 feet 10 inches), width (3 feet 3 inches) and weight (12,500 pounds), have been found so convenient in practice that they will be gradually adopted at all the company's mines.

The coal is passed through two processes. As soon as the coal is taken from the mine it is dumped onto a 4-inch bar screen, after which it is picked over by women in order to separate the coal from shale. These screening operations are now mostly done by manual labor, but new improved screening plants run by electricity will be shortly substituted.

There are 4 compressed air machines in use; 3 duplex Corliss made by the Ingersoll-Sergeant Company, and 1 three-stage of the Norwalk Iron Works. The former are for driving the coal cutters as well as the small ventilators and the hoists, etc., inside and outside of the mine; the latter one drives the air locomotives.

A medical department is organized, with an ample staff of doctors and nurses, and with all appliances necessary for treating sick or wounded persons. Fire engines are also kept, and special communication is established with the mines by telegraph and telephone. From the mine to Mororan is 88 miles, to Otaru, 97 miles. The total number of people employed is 3,770, including 3,256 men and 514 women.

The Sorachi mine is situated at Utashinai, in the Sorachi district of Ishikari province. It consists of 2 mines, the upper Utashinai, known as Sorachi, and the lower Utashinai, as Kamui. Its total area is 6,571,189 tsubo (5,476 acres). The mine has long been known. In 1873, Viscount Enomoto, then chief of the Colonization Bureau, went up the Sorachi river while traveling to investigate the products of Hokkeido, and finding coal, brought back samples for analysis. In the following year, Professor Lyman, after a careful examination, made a sketch of the locality, and took photographs, which were distributed to the public. Not until 1876, however, was an official survey undertaken. In December, 1889, the company obtained the mining concession. Work was commenced in 1891, the railway being opened in the same year. The coal has been proved to have strong calorific qualities. It is solid and well adapted for gas making.

There are 10 seams. varying from 3 feet to 7 feet, and methods of working and machinery used, being similar to those at the Yubari mine, need not be described here; except that an electric railway is established in the Sorachi mine. From the mine to Mororan is 117 miles, to Otaru, 80 miles. The total number of people employed is 2,299, including 1,989 men and 310 women.

The Poronai mine is situated at Poronai, in the Sorachi district of Ishikari province. It has an area of 873,101 tsubo (727 acres).

At the beginning of the Meiji era certain persons found coal in the district and carried samples to the Colonization Bureau, where, however, no attention was paid to the matter; but in 1872, Viscount Enomoto, then chief of the Bureau, caused investigations to be made and had the coal analyzed, the result being that it was pronounced the same as the coal of the well-known mine at Takashima in Hizen. Subsequently, between 1873 and 1876, Messrs. Lyman and Munroe were appointed to make a survey and to compile a report as to the quantity and quality of the mineral and as to transportation facilities. Ultimately, in 1878, the Government made an appropriation as capital for beginning work; in February, 1879, an American expert was employed, and in December of the same year the sinking of the main level was commenced, and in 1883 coal began to be extracted. The work was carried on under the direction of the Government until 1889, when the company bought the mine.

The coal is bituminous, non-coking, with strong heating power and good combustion. It is not suitable for gas making or iron smelting, but is excellent for use in locomotives.

The methods of working, and the machinery used, being similar to those at the Yubari mine, need not be described here.

From the mine to Mororan is 96 miles; to Otaru, 57 miles. The total number of people employed is 1,738, including 1,589 men and 149 women.

Ikushunbetsu mine is situated at Ikushunbetsu, in the Sorachi district of Ishikari province. It has an area of 734,648 tsubo (612 acres). The first investigation of the locality was made by order of the Colonization Bureau in 1880, and in the following year an American expert named Potter continued the survey. In 1885, work was commenced under the Department of Agriculture and Commerce, but it did not continue long, and in 1889 the Government transferred the mine to the Hokkaido Tanko Tetsudo Kaisha. From the mine to Mororan is 97 miles; to Otaru 58 miles. The total number of people employed is 563; 469 men, 94 women.

The Oiwaki coke works are situated near Oiwaki station, about 62 miles from Mororan, and occupy an area of 31,469 tsubo, or over 26 acres. Several branch lines of rail extend from the Mororan main line into the center of the plant, affording every facility for the handling and transportation of the materials and finished products.

The coke ovens are of the Cornish type, with slight modifications, and include 20 large ovens 27 feet long, 5 feet high, and 4 feet wide, and 20 smaller ones 27 feet long, 5 feet high, and 3 feet wide, constructed side by side, all in one long line, and lined inside throughout with firebricks. A stone platform, 27 feet wide and 4 feet high, is built in front of the ovens, upon which rails are laid connecting with the main railroad. The main flue extends along the foot of the platform, parallel with the line of ovens, being constructed in three sections, each connecting with a separate chimney, built of iron, 70 feet

high and 3 feet diameter. Five rails are laid along the top of the ovens, for carrying and feeding the material into them, and another line passes immediately behind them for operating the pushing machine.

The utmost care has been given to the coal washing plant, which consists of the following machines: 1 track conveyor, 2 Elliot coal washers, 2 Jeffery coal washers, 1 digger, 2 centrifugal pumps, 2 disintegrators, and 2 bucket elevators.

These machines are driven by a single horizontal cylinder engine, for which power is generated by two boilers, of similar shape, placed within the main flue of the coke ovens, in such a manner that the gas from the ovens is utilized bv them as fuel.

Water for washing coal and cooling the coke is taken from an adjacent stream by means of a flue 126 ken (756 feet) long, and 3 pulsometers are provided to raise the water to a stone reservoir, some 36 feet above the level of the works, from which the water is conducted to the front of the coke ovens on the one hand, and to the coal washing plant on the other.

The material, dust coal, is mixed according to the quality of coke to be produced. This mixed coal is carried to the highest part of the washing place, by means of the track conveyor, where it is dumped into the Elliot coal washer and undergoes the operation of selection and washing. After this part of the process is completed the washed coal is screened through a 0.2-inch mesh. The coal remaining on the screen is conveyed by the bucket elevator to the disintegrator, where it is thoroughly ground into powder, and is then, together with the coal which passed through the mesh, sent to the Jeffery coal washer for further washing.

The coal, after passing through all these processes, is brought over the ovens in 4-wheeled cars and thrown, in lots of 5 to 6 tons at one charge, into each oven, where it remains 48 hours before its manufacture into coke is completed. The coke thus produced is pushed out of the ovens, on to the stone platform, by the pushing machine, and, after being cooled by water, is loaded on the cars and carried direct by rail to the port of distribution.

The construction of the works was commenced in April, 1901, and completed in the same month of 1902.

Central Station Statistics of Germany.

Elec. Zeitung, in a recent issue gives well put together, extended statistical tables giving information concerning electric central stations in Germany, the statistics being brought up to April 1, 1903. Nine hundred and thirty-nine stations are noticed, while no information was available concerning 32 stations, so that in reality the number of central stations in Germany is 971. Isolated plants are not included. There are now 50 plants which have a capacity above 2,000 kw. The highest capacity, namely, 26,523 kw., is that of the Mohabit station of Berlin. The total capacity of these 50 stations, which are situated in 37 cities, is 271,479 kw. The total number of plants is 939 (against 870 in 1902), to which there are connected 5,050,584 (against 4,200,203 in 1902) incandescent lamps of 50 watts, 93,415 (against 84,891 in 1902) arc lamps of 10 amp., and motors of an aggregate capacity of 218,953-horse power (against 192,059-horse power in 1902). There are a number of stations which supply current, not to a single town, but to a number of towns. For instance, the Bruehl station supplies 66 towns, at a distance of 9 to 12 miles, with current for light and power. The whole industrial district of upper Silesia is supplied from a single plant, while the water power plant at the Rhine falls supplies 46 towns. These stations have a very favorable influence on the industrial development of a district. Some larger tramway companies intend to enlarge their tramway stations into stations for supplying light and power over greater districts. In the industrial districts near the Rhine, there are a number of smaller stations which supply current for power in houses and smaller shops. For instance, the station of Anrath, near Crefeld, supplies current to motors, each of not more than a quarter or a half horse power, used for silk manufacture in houses. The statistical tables cover 28 pages.

The following figures are taken from the summary of the 939 stations: There are 766 stations with 257,243 kw, using direct current; 45 stations with 30,550 kw., using single or 2-phase alternating current; 59 stations with 83,283 kw., using 3-phase current; two stations of 970 kw., with monocycle systems, while 67 stations use a mixed system. Of the latter, 55 stations with 102,470 kw., use a combined 3-phase and direct current system, while 12 siations with 8,041 kw, use a combined single phase and direct current system. The 939 stations are situated in 906 cities; 552 stations with 316,235 kw, use steam power, 98 stations with 24,851 kw. use water power, 61 stations with 6,378 kw. have gas engines. In one station with 220 kw. wind power is utilized; 196 stations with 41,861 kw use both hydraulic and steam power. Of the 939 stations, 339 have a total capacity up to 100 kw, 422 stations a total capacity between 101 and 500 kw. 90 between 501 and 1,000, 39 between 1,001 and 2,000, 30 between 2,001 and 5,000 kw., and 19 more than 5,000 kw. There are in use 203,758 electricity meters.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

At the annual meeting of the Niagara Light, Heat and Power Company, of Tonawanda, N. Y., the officers chosen were: President, L. T. Palmer; Secretary, David F. Tilley; Treasurer, George A. Lewis; Trustees, Wm. A. Mason and George A. Lewis. The new building, to house two benches of 6's, a complete condensing plant and station meter, are closed in and completed—this equipment will virtually double the capacity of the plant. The new storage holder (100,000 cubic feet), which was built by the Davis & Farnum Manufacturing Company, of Waltham, Mass., is ready for testing; wherefore, on or before April 1st, Manager Palmer will have the satisfaction of directing a plant up-to-date in every particular. The output for 1903, as compared with that for 1902, showed an increase of 40 per cent., and the number of meters placed scored a gain of 45 per cent. The sale and rental of gas stoves, ranges, water heaters and the like were beyond any thought or estimate of Mr. Palmer and his associates. Our informant further adds, "Prospects are good that 1904 will be ahead of 1903." And so may it prove.

Mr. G. I. Vincent has been appointed Superintendent of the Frankfort District, United Gas Improvement Company's Philadelphia works.

Owing to different arrangements, likely resolved upon by one or another of the many difficulties that recently beset the evangelizing Mr. Dowie, the construction of a gas works at Zion city, Ills., has been deferred.

Mr. J. B. Mills, formerly with the North Shore Gas Company, of Waukegan, Ills., has engaged with Messrs. Lindsay & Company, to represent them in the sale of their well-known lighting specialties. They have secured a good man, and he is with a good house.

Mr. Byron E. Chollar, the sphynx of the gas business, and as honorable a gentleman as was ever engaged therein, has built himself a comfortable home in Kansas City, Mo. "Now he never cares to wander from his own fireside," but those who are carelessly trifling with some of his property may find that Brother Chollar still has his feet under him.

The proprietors of the Altoona (Pa.) Gas Company announce that, beginning with April 1st, the selling rate will be put at $1.20 per 1,000 cubic feet, less 10 per cent. for prompt payment.

The following officers have been elected by the shareholders in the Waynesboro (Pa.) Gas Company: President, W. H. Brown; Vice-President, M. T. Brown; Secretary, W. Middlekauff; Treasurer, W. C. Schaibley—the latter succeeds Mr. Jno. M. Wolff, resigned.

Mr. J. A. Mayers informs us that the Gas Company, of West Chester, Pa., will install duplex purifiers having the capacity of about 350,000 cubic feet per day. The construction is to be made by the Gas Machinery Company, of Cleveland, O. The old water gas set at West Chester has been remodelled by the local Superintendent, Mr. C. F. Cattell. Some main extensions will also be made this summer.

Mr. Henry W. Holmes, for some years Manager of the Wellsbach Light Company, of Pittsburg, Pa., died at his home in Crafton, Pa., early this month. He was in his 51st year, having been born in Allegheny City, Pa., October 22, 1853.

At the annual meeting of the Willimantic (Conn.) Gas and Electric Light Company the officers elected were: Directors, J. F. Church, Geo. A. Lewis, Emerson Stone, David F. Tilley and Chas. F. Evans—the last named succeeds his father—the late Edwin Evans; President, J. F. Church; Treasurer, George A. Lewis; Assistant Treasurer, D. F. Tilley; Secretary, C. W. Noyes.

At a special meeting of the Board of Directors of the New Haven (Conn.) Gas Light Company the following minute to the memory of the late Hon. Francis Wayland was adopted:

"The members of this Board have learned with deep sorrow of the death, on Saturday, January, 9, 1904, of their associate, Hon. Francis Wayland, the senior member of the Board in years, though not in service. A prolonged illness, borne with cheerful courage and patient resignation, has for more than two years prevented his attendance at the meetings, though he never lost hope and belief that he would again take up his part in the activities of the Company, in which he continued to take a deep interest.

"He has been a member of the Board since November 4, 1876, when he was chosen to fill the vacancy caused by the death of the Hon. Morris Tyler. So long as he was able to do so, he was a most regular attendant at its meetings, and faithfully discharged all of the duties that were laid upon him.

"He was a man of imposing and distinguished presence, warm hearted, and a most loyal and devoted friend. For that which he thought right or for those whom he loved, no sacrifice was too great.

"His career was varied to a remarkable degree. In public life he had served in many capacities, and his acquaintance with public men in this and other countries was very extensive, The last years of his life were devoted mainly to philanthropic and humanitarian work, and to the up-building of the Yale Law School, which was his greatest achievement. Of this school he was Dean for more than 30 years. In the various spheres of his activity he won many distinctions and countless friends. His public services and private acts of kindness have endeared him to this community, and all who knew him unite in mourning his loss."

THE Fitchburg (Mass.) Gas and Electric Company is arranging for the construction of a storage holder up to retaining 500,000 cubic feet.

A WASHINGTON (D. C.) correspondent forwards the following: "Among the bills recently received by the District Commissioner from the Senate Committee on the District of Columbia, with a request for an expression of the opinion of the Commissioners thereon, was Senate bill No. 3,042, introduced by Senator Foster, of Washington, providing that after the 1st of July next the price of illuminating gas furnished by the Washington Gas Light Company and the Georgetown Gas Light Company to private consumers shall be reduced from not exceeding $1 to not exceeding 75 cents per 1,000 cubic feet, except that if private consumers do not pay monthly any gas bill within 10 days after presentation the price shall be $1 per 1,000 cubic feet. The second section provides that if either of the Companies charges and collects an amount in excess of the prices fixed it shall forfeit its charter rights 'and it shall be the duty of the district attorney for the District of Columbia to prosecute such offending company for such violation.'

"Commissioner Macfarland will recommend to the Commissioners that a public hearing be given on this bill at an early day in order that all the arguments for and against the proposed change may be presented by consumers on the one side, and representatives of the Gas Light Companies on the other. Senator Foster's bill has the following preamble:

"*Whereas*, the Washington Gas Light Company of the District of Columbia has, without warrant of law, issued and delivered to the stockholders of said Company a stock bonus of $2,600,000 for the purpose of absorbing the large surplus earnings of said Company; therefore, be it enacted, etc."

THE Gas Machinery Company, of Cleveland, has been awarded a contract by the Western Electric Company, of Chicago, for condensing, scrubbing and purifying apparatus to be used in connection with the water gas plant now being erected by the Western Company at Hawthorne, Ills. The gas will be used for industrial purposes.

MR. L. N. LINCOLN, since 1899 the chief Clerk of the Elgin (Ills.) American Gas Company, has been appointed Superintendent of the Mauch Chunk (Pa.) Gas Company.

AT the annual meeting of the Citizens Gas Company, of Anderson, Ind., the officers elected were: President, J. F. Netterville; Vice-President, R. M. Atherton; Treasurer, J. T. Terhune; Secretary, Henry Millspaugh; Superintendent, H. C. Sisco.

MR. M. C. OSBORNE, of Santa Rosa, Cal., is contemplating the advisability of constructing a gas plant in Douglas, Ariz.

THE Consumers' Gas Company, of Toronto, Ont., has applied to Parliament for the right to increase its capital from $2,000,000 to $5,000,000.

AT the annual meeting of the Belleville (Ills.) Gas and Electric Company the Directors chosen were: L. D. Turner, Edward Abend, Henry A. Kircher, George Gauss, M. M. Stephens, R. D. W. Heider and Charles Becker.

A CORRESPONDENT, writing from Hartford, Conn., under date of the 15th inst., incloses the following: "The annual meeting of the Hartford City Gas Light Company resulted in a general change in the Directors and officers. Six Directors retired in the persons of Gen. Jno. P. Harbison (ex-President), ex-Gov. Jas. L. Howard, Atwood Collins, Francis B. Coley and Henry K. Morgan. The new Board comprises E. R. Bennett, Sylvester C. Dunham, Henry A. Redfield, George Roberts, Arthur L. Shipman, S. R. Bertron, Francis R. Cooley, Richard S. Storrs and John T. Robinson. The Directors perfected the following organization: President, E. R. Bennett; Vice-President, S. R. Bertron; Secretary, Thomas Evans; Treasurer, R. E. Slade. At the stockholders' meeting, President Harbison presented the figures respecting last year's business. There was shown a fair increase in output and a corresponding gain in net earnings. All the old employees will be retained for the present at least. Mr. Bertron saying that any man showing himself capable of filling his position would be kept. There will be no changes until a more complete study of the situation is made by the new management, showing what the capabilities of each man are. The Directors will meet in about 10 days subject to the call of the President. In the general management of the Company Mr. Slade is the successor of Gen. Harbison. The following resolutions of thanks to Gen. Harbison, presented by Atwood Collins, were adopted:

"'*Whereas*, Mr. John P. Harbison has signified his intention to retire from the office of President and Treasurer of this Company; and

"'*Whereas*, Mr. Harbison has served this Company as an employee and officer for a continuous period extending over nearly half a century, and has, during that period, devoted his time and energy to the service of this Company, giving in this way the greater part of his life work to the interests of the Company; and

"'*Whereas*, Mr. Harbison's service to this Company has been characterized by energy, perseverance and ability in a marked degree; therefore be it

"'*Resolved*, That we, the stockholders of the Hartford City Gas Light Company, do hereby express our deep appreciation of Mr. Harbison's long and able service to this Company, and we do hereby extend to him our wish for his continued health and welfare in the future.

"'*Resolved*, further, That this resolution be entered on the records of this Company and that the Secretary of this Company present to Mr. Harbison an engrossed copy of the same.'"

MR. G. R. CHAMBERLIN has been appointed Secretary of the Grand Rapids (Mich.) Gas Light Company, vice Mr. H. B. Wales, whose taking charge of the Company at Vincennes, Ind., has been heretofore noted.

MR. W. E. BARRETT will, on the 1st prox., assume the duties of General Superintendent of the gas division of the properties of the Scranton (Pa.) Gas and Water Company.

THE Louisville (Ky.) Gas Company has arranged with Messrs. Newman & Frankell, of Pittsburg, Pa., for its coal supply. We also understand that the Louisville Company is contemplating the placing of two 8-foot 6-inch water gas generators.

Electricity remarks it is about time that something was done to eliminate the dangers of the third rail on the elevated roads in Greater New York. An attempt is to be made to do this "something." A bill is about to be introduced in the Legislature at Albany which, if it becomes a law, will oblige transportation companies to improve their systems. We say "if" it becomes a law, for every effort will be made by transportation companies in the State to have it tabled indefinitely. The bill as it is drawn empowers the State Railroad Commissioners to compel railroad companies to carry out the recommendations of the Board. As the law now stands the Commissioners can order changes, but the companies may make them or not as they see fit. It is said to be the intention of the State Railroad Commissioners if the bill becomes a law to require the Manhattan and the Brooklyn Rapid Transit Companies to devise a safer method of using the third rail system. Such being the case it is to be hoped the bill will not find its way into one of the numerous pigeon holes that abound in Albany.

THE AMERICAN GAS LIGHT JOURNAL

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, JANUARY 25, 1904.

The Market for Gas Securities.

The local market for gas shares was of the queer sort last week, Consolidated having been in good demand at increasing prices. The closing to-day (Friday) in it was made at 195¾ to 196, and the cause for the rise, from a purely speculative point of view, is hard to determine, unless it is that some short interests took alarm and scurried to cover. The first gun in the hands of the Albany marksmen, so far as gas is concerned, was handed in by Assemblyman Miller, of Kings, who asks that Mayor McClellan appoint a committee of 5 to inquire into the quality of gas supplied in New York city, and the cost of the production of the gas now served up. This Miller must lack dust. Of course, the Miller presentation is but a forerunner of other sorties.

Brooklyn Union is offered at 203, ex-rights, which looks that holders think about 220 is a fair figure for it. Consolidated, of Baltimore, has straightened up a bit, 59 being freely bid for it. Peoples, of Chicago, is virtually at par, and Laclede common is 100 bid. Buffalo (N. Y.) continues weak, and Washington (D. C.) is also a trifle on the slow side.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JANUARY 25.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	195¾	196
Central Union, Bonds, 5's.	3,000,000	1,000	104	105
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan	658,000	..	108	113
Mutual	3,500,000	100	200	220
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. .. Bonds, 5's	11,000,000	1,000	103	105
Northern Union, Bonds, 5's.	1,250,000	1,000	105	106¼
New York and East River . Bonds 1st 5's	3,500,000	1,000	102	106
" 1st Con. 5's	1,500,000	..	109	111
Standard	5,000,000	100	135	140
Preferred	5,000,000	100	155	170
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	117
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	197	203
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	⅛	3/16
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works...	450,000	100	28	30
" 1st Mtg. 5's	500,000	1,000	93	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	4⅝	4¾
" " Bonds, 5's	5,250,000	1,000	65	69
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co.	20,500,000	100	98	99
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101½
Columbus (O.) Gas Lt. & Heating Co	1,682,780	100	88¾	89⅛
Preferred	3,026,560	100	107½	109
Consumers, Jersey City Bonds	600,000	1,000	100	102
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	59	59¼
Mortgage, 6's	3,000,000	..	..	118
Chesapeake, 1st 6's.	1,000,000	..	..	..
Equitable, 1st 6's.	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	113
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	86	90
Consolidated G. & E. Co.'s. Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co.	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	99¼	100
Detroit Gas Co., 5's	931,000	1,000	75	75¼
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	85	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104¼	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	50	65
" Bonds, 6's	2,650,000	..	103¾	106½
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	103¾
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	79	90
Preferred	2,500,000	100	100	110
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	136	140
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	108¼
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	184¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,000,000	..	105	105¾
New Haven	1,000,000	25	250	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	99¾	100
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	15,800,000	100	67	67¼
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	96½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	46	48
Bonds	2,047.000	1,000	94	96
Washington, D. C	2,600,000	20	273½	278¾
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	.	..	..
Wilmington, Del.	600.000	50	232	..

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WANTED, POSITION
AS SUPERINTENDENT,

By a first-class gas engineer and superintendent. Understands the manufacture of coal and water gas; also, the laying of high and low pressure mains in detail. Is a successful hustler for new business. Can furnish required references. Address, "UP-TO-DATE,"
1493-3 Care this Journal.

Position Wanted
As Manager or Superintendent,

By a young man familiar with construction and operation of coal and water gas plants, under high or low pressure system of distribution. Best of references furnished.
1493-3 Address, "S.," care this Journal.

WANTED,
Situation with a Gas Company.

Competent to take an executive position. Twelve years' experience in accounting and sales' departments of a gas and electric light company. Age 33. Good references.
1493-2 Address, "J. A. S," Box 563, Mt. Vernon, Ind.

Position Wanted
As Superintendent of Water Gas Plant

In city of 15,000 to 20,000 inhabitants, by an experienced man. Has been successful and can give good references.
1494-tf Address, "M. K.," care this Journal.

Wanted, Position
AS MANAGER

Of gas, or gas and electric light plant, by a man who can show first-class results in former positions. South or Southwest preferred.
1494-tf Address, "T. W," care this Journal.

WANTED,

By a young man, who is at present manager of a gas company in a city of 35,500 population, a position as manager or superintendent of a gas company in a city of from 30,000 to 60,000 population.
1493-9 Address, BOX 186, NEW BEDFORD, MASS.

Position Wanted.
Experienced Man Wants Position as Manager or Superintendent of Coal Gas Property.

Single man, 30 years of age, with 10 years' experience and first-class references. Address, "COAL GAS,"
1489-tf Care this Journal.

Position Wanted.
An Experienced Bench Mason,

Fully competent to take charge of the construction of benches of the most improved pattern, desires a position. Can furnish first-class references. Address, "X. X.,"
1494-2 Care this Journal.

WANTED,
A Man as General Foreman

For a works in Pennsylvania, making coal and water gas, and putting out over 100,000,000 cubic feet. Must be thoroughly sober, a good mechanic, and accustomed to handling men. Apply, stating wages expected, to
1494-2 "FOREMAN," care this Journal.

FOR SALE.
One Set of Lowe System Water Gas Apparatus.

Second-hand. For details write to the
DOVER GAS LIGHT COMPANY,
1485-tf DOVER, DEL.

FOR SALE.

Complete 10-foot set of gas apparatus.
Condensers, washer, tar extractor,
Purifiers, valves and dry center-seal.

☞ Perfect condition; can be examined here.

NORTH ADAMS GAS LIGHT CO.,
1493-tf NORTH ADAMS, MASS.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
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OHIO GAS LIGHT ASSOCIATION.

NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, JANUARY 25, 1904.

The Market for Gas Securities.

The local market for gas shares was of the queer sort last week, Consolidated having been in good demand at increasing prices. The closing to-day (Friday) in it was made at 195¾ to 196, and the cause for the rise, from a purely speculative point of view, is hard to determine, unless it is that some short interests took alarm and scurried to cover. The first gun in the hands of the Albany marksmen, so far as gas is concerned, was handed in by Assemblyman Miller, of Kings, who asks that Mayor McClellan appoint a committee of 5 to inquire into the quality of gas supplied in New York city, and the cost of the production of the gas now served up. This Miller must lack dust. Of course, the Miller presentation is but a forerunner of other sorties.

Brooklyn Union is offered at 203, ex-rights, which looks that holders think about 220 is a fair figure for it. Consolidated, of Baltimore, has straightened up a bit, 59 being freely bid for it. Peoples, of Chicago, is virtually at par, and Laclede common is 100 bid. Buffalo (N. Y.) continues weak, and Washington (D. C.) is also a trifle on the slow side.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JANUARY 25.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	195¾	196
Central Union, Bonds, 5's.	3,000,000	1,000	104	106
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan	658,000	..	108	112
Mutual	3,500,000	100	200	290
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co..				
Bonds, 5's	11,000,000	1,000	103	105
Northern Union, Bonds, 5's.	1,250,000	1,000	105	106½
New York and East River				
Bonds 1st 5's	3,500,000	1,000	102	106
" 1st Con. 5's	1,500,000	..	109	111
Standard	5,000,000	100	135	140
Preferred	5,000,000	100	155	170
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	117
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	197	203
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	⅛	3/16
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	4⅜	4½
" " Bonds, 5's	5,250,000	1,000	65	69
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co.	29,500,000	100	98	99
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101⅛
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89¼
Preferred	3,026,500	100	107⅛	109
Consumers, Jersey City Bonds	600,000	1,000	100	102
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	59	59¼
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	86	90
Consolidated G. & E. Co.'s.				
Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co.	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	99¼	100
Detroit Gas Co., 5's	381,000	1,000	75	75¼
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	50	65
" Bonds, 6's	2,650,000	..	103½	106½
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	79	90
Preferred	2,500,000	100	100	110
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	136	140
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	107½	108½
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	184¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	250	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	99¾	100
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	15,800,000	100	67	67¼
St. Joseph Gas Co.				
" 1st Mtg. 5's	751,000	1,000	92	94½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	46	48
Bonds	2,047.000	1,000	94	96
Washington, D. C	2,600,000	20	273¾	278¾
First mortgage 6's	600,000	..	..	..
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WANTED, POSITION
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By a first-class gas engineer and superintendent. Understands the manufacture of coal and water gas; also, the laying of high and low pressure mains in detail. Is a successful hustler for new business. Can furnish required references. Address, "UP-TO-DATE."
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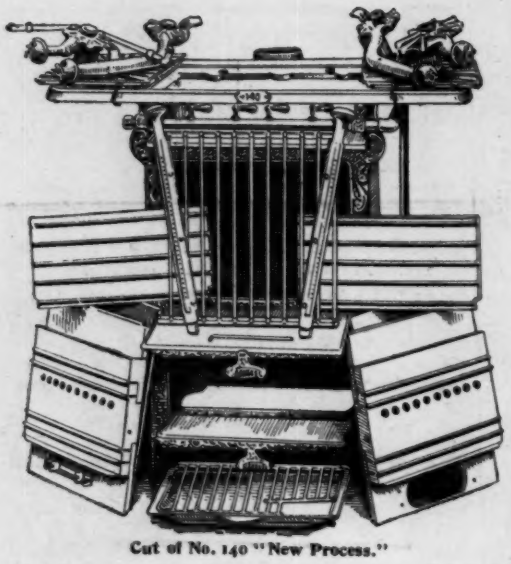

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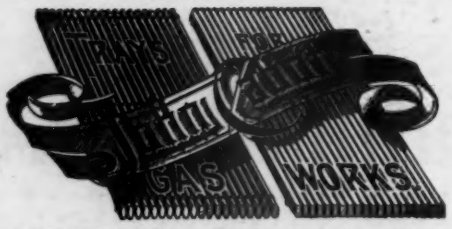

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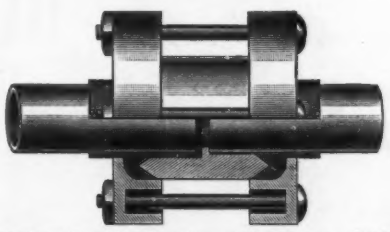

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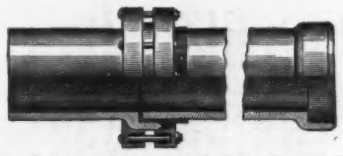

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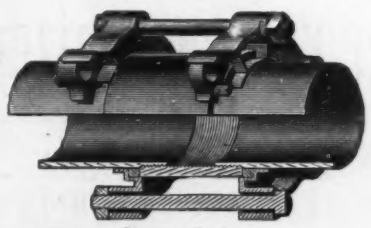

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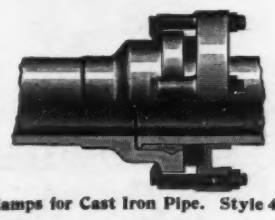

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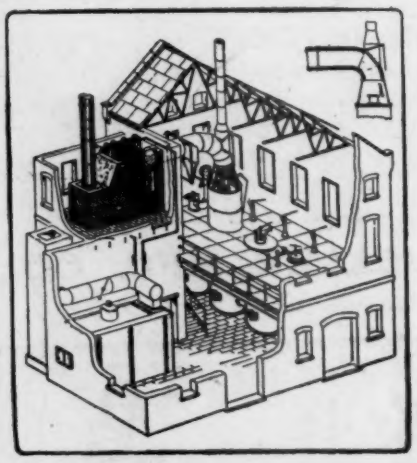

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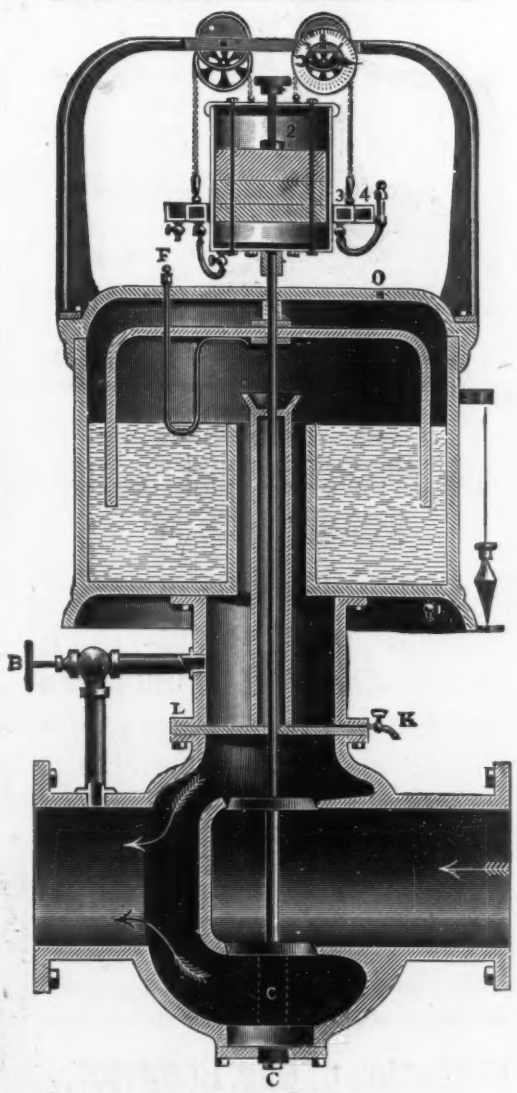

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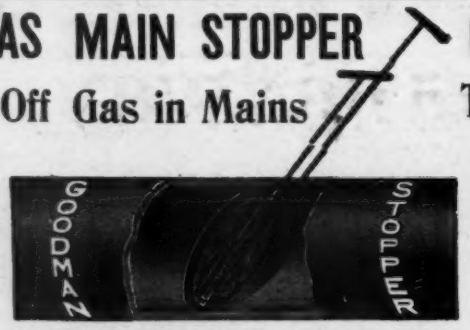

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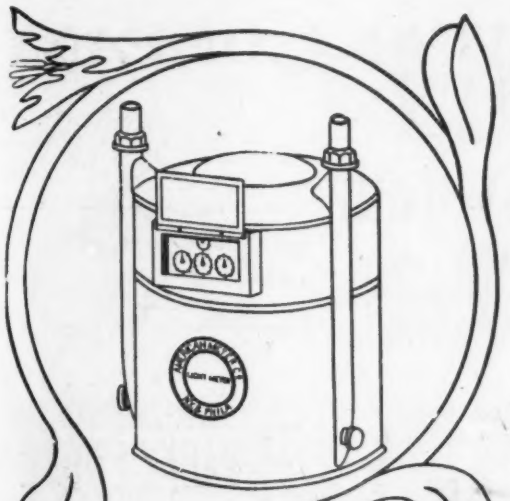
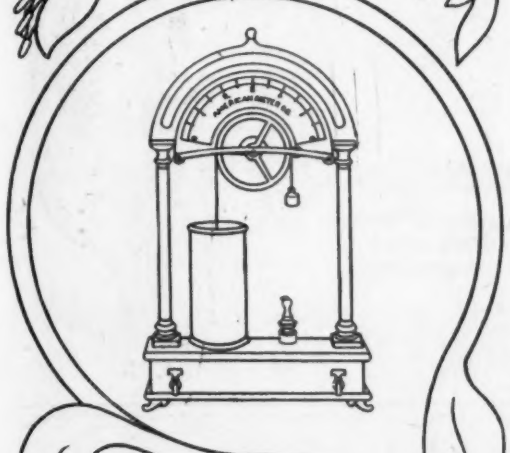
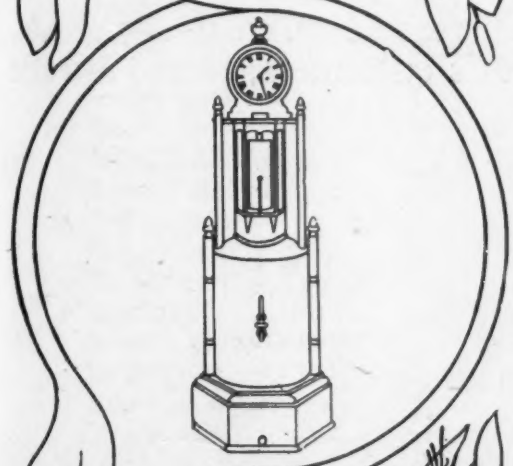
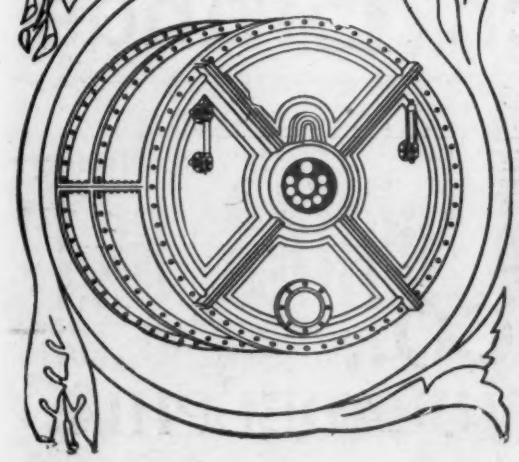




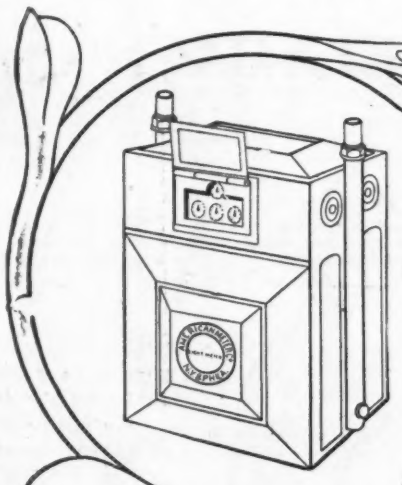


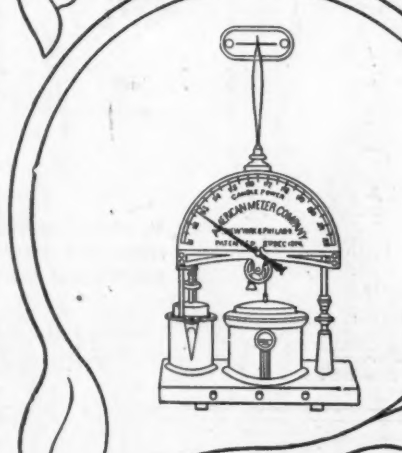


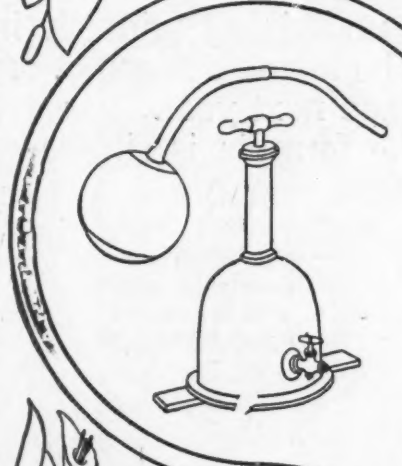
PUBLIC LIGHTING TABLE.

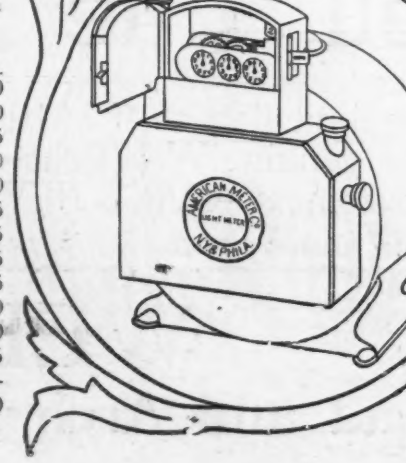
FEBRUARY, 1904.

Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light.	Extinguish.
				P.M.	A.M.
Mon.	1	No L. FM	No L.	5.05	6.15
Tue.	2	No L.	No L.	5.05	6.15
Wed.	3	5.50 PM	9.00 PM	5.05	6.15
Thu.	4	5 50	10.20	5.05	6.15
Fri.	5	5.50	11.20	5.10	6.10
Sat.	6	5.50	12.30 AM	5.10	6 10
Sun.	7	6.00 LQ	1.30	5.10	6.10
Mon.	8	6.00	2.30	5.10	6.10
Tue.	9	6.00	3.30	5.10	6.10
Wed.	10	6.00	4.20	5.10	6.10
Thu.	11	6.00	5.10	5.10	6.10
Fri.	12	6.00	6.00	5.20	5.55
Sat.	13	6.00	6.00	5.20	5.55
Sun.	14	6.10	5.50	5.20	5.55
Mon.	15	6.10 NM	5.50	5.20	5.55
Tue.	16	6.10	5.50	5.20	5.55
Wed.	17	6.10	5.50	5.20	5.55
Thu.	18	6.10	5.50	5.20	5.55
Fri.	19	6.10	5.50	5.30	5.55
Sat.	20	8.50	5.50	5.30	5 55
Sun.	21	9.50	5.40	5.30	5.55
Mon.	22	10.50	5.40	5.30	5 55
Tue.	23	11.50 FQ	5.40	5.30	5.55
Wed.	24	12.50 AM	5.40	5.30	5.55
Thu.	25	1.40	5.40	5 30	5.55
Fri.	26	2.40	5.40	5.30	5.45
Sat.	27	3.30	5.40	5.30	5.45
Sun.	28	4.20	5.40	5.30	5.45
Mon.	29	No L.	No L.	5.30	5.45









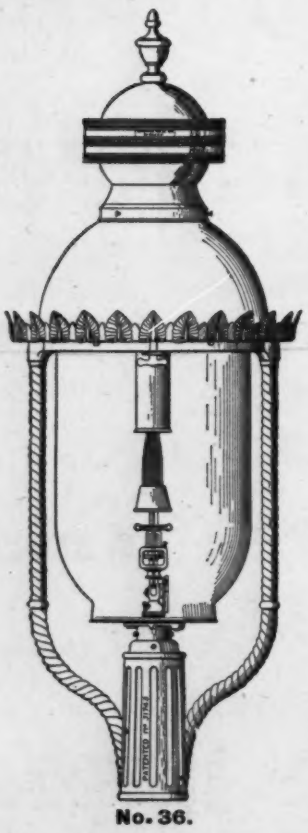
TOTAL HOURS LIGHTING DURING 1904.

By Table No. 1.	Hrs.Min.	By Table No. 2.	Hrs.Min.
January	225.00	January	423.20
February	205.40	February	367.40
March	187.40	March	355.35
April	169.50	April	298.50
May	152.30	May	264.50
June	137.20	June	234.25
July	138.50	July	243.45
August	151.00	August	280.25
September	164.40	September	321.15
October	191.30	October	374.30
November	210.30	November	401.40
December	237.10	December	433.45
Total, yr.	2171.40	Total, yr.	4000.00

NEW YORK, 33 Nassau Street. BOSTON. 814 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, Foot of Orleans Street. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



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Controls and Operates the

Welsbach System of Street Lighting,

Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

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IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

AN underlying principle in business is to show an increase each year---to grow. The astute dealer not only seeks to retain this year's customers, but to attract new trade next year.

The formula is simple-

THIS SHIELD IS THE WELSBACH TRADE MARK.

IT IS A GUARANTEE AND A PROTECTION.

Sell The Welsbach Brands.

The imitation stuff is bad for the customer---which is bad for you.

The genuine Welsbachs---Burners or Mantles---make satisfied customers---keep customers---MAKE NEW ONES.

And your profit isn't merely dollars and cents.

WELSBACH CO.,

Broad and Arch Sts., PHILADELPHIA.

THE UNITED GAS IMPROVEMENT COMPANY

For the Year Ending December 31, 1903, has been Awarded Contracts in the Following Places for

Standard Double-Superheater Lowe Water Gas Apparatus.

Rochester, N. Y.	Chester, Pa.	Savannah, Ga.
Baltimore, Md.	Lynn, Mass.	New York (Central Union Co.)
Chicago, Ills.	Newark, N. J.	Cicero, Ills.
Amesbury, Mass.	Washington, D. C.	Chicago (Ogden Co.)
Aberdeen, S. D.	Boone, Ia.	Easton, Pa.
Winsted, Conn.	Pueblo, Col.	Lawrence, Mass.
Canon City, Col.	Charlotte, N. C.	Council Bluffs, Ia.
Schenectady, N. Y.	Fall River, Mass.	Chattanooga, Tenn.
Hagerstown, Md.	Duluth, Minn.	Tuckerton, N. J.
Malden, Mass.	New York (Mutual Co.)	Springfield, O.
Bridgeport, Conn.	Waltham, Mass.	Easton, Pa. (2d contract).
Albert Lea, Minn.	Dover, Del.	Mobile, Ala.
Brooklyn, N. Y.	York, Pa.	Conshohocken, Pa.
Kansas City, Kas.	Minneapolis, Minn.	Mason City, Ia.
Hempstead, N. Y.	Allentown, Pa.	

TOTAL SETS FOR 1903, ... 62
TOTAL DAILY CAPACITY, ... 62,950,000 cubic feet.
TOTAL SETS TO DATE, ... 508
TOTAL DAILY CAPACITY, ... 362,780,000 cubic feet.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

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Brooklyn Fire Brick Works,

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Office:
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OFFICE: 119 E. 23D STREET, NEW YORK CITY

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Works, Weber, N. J.
Main Offices, Park Row Bldg., New York.

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Standard Fire Brick and Gas Retorts.

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OFFICE, 418 to 422 East 23d St., N. Y.

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BENCH SETTINGS,
Fire Brick, Tiles, Etc.

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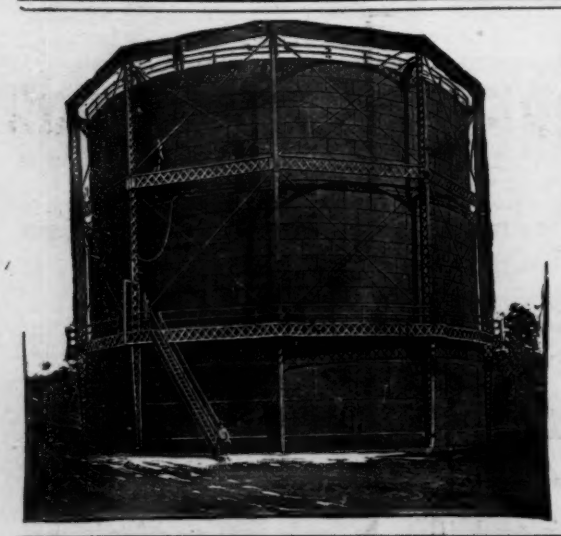

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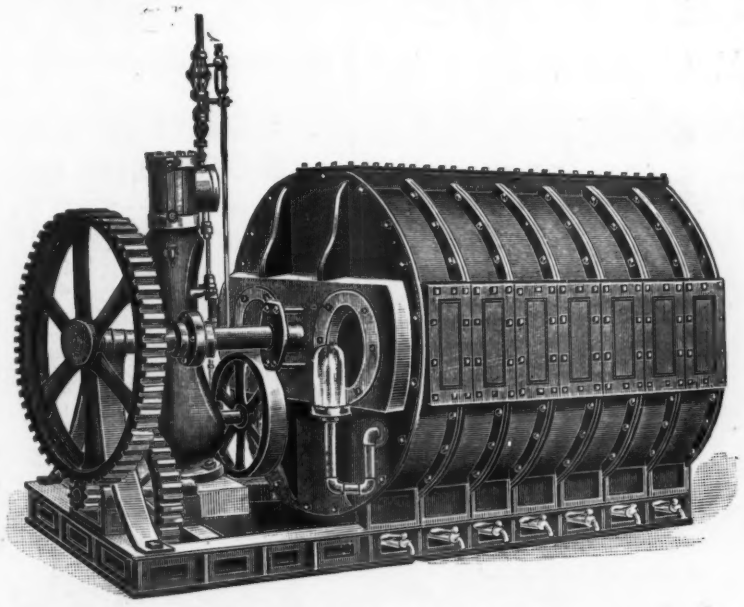

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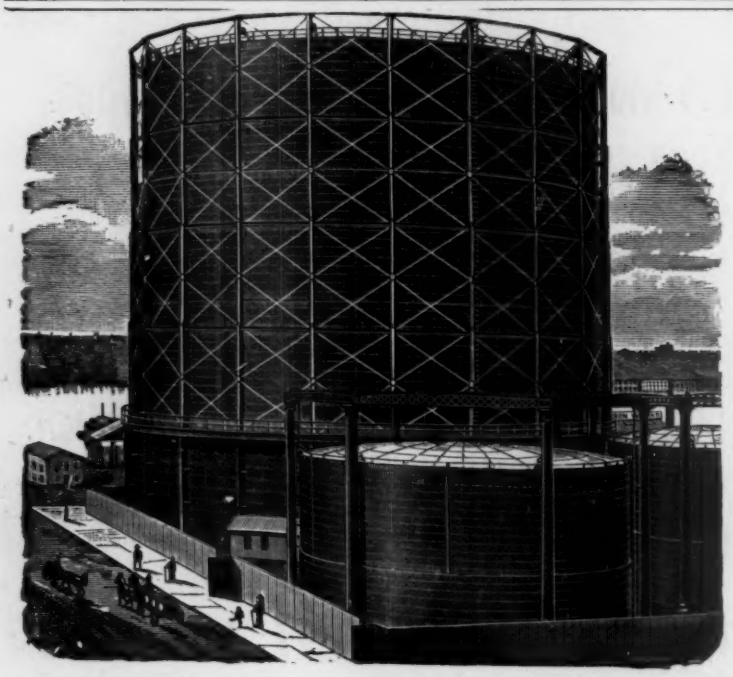

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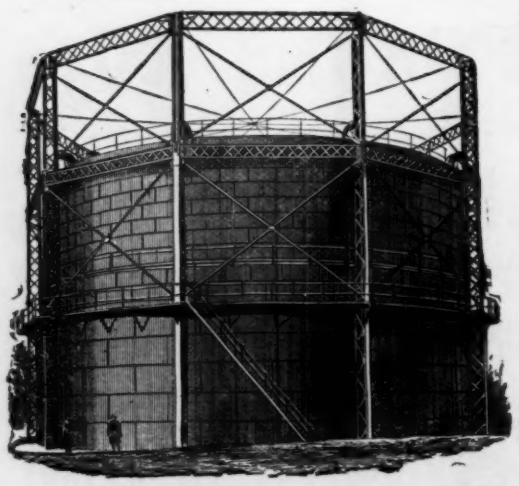

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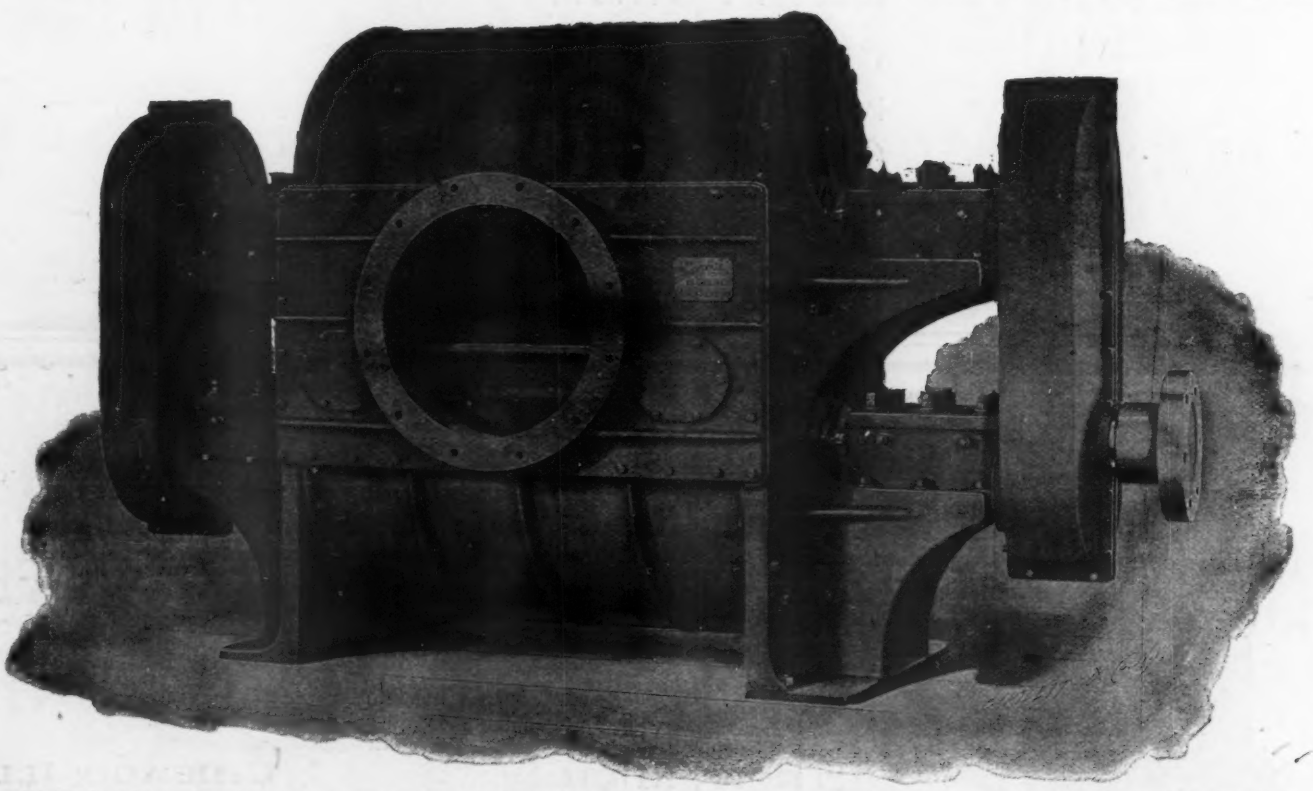

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